Mobility 2030






Certified per TCA 13-4-202 as a part of the Nashville-Davidson County General Plan adopted by the Metropolitan Nashville-Davidson County Planning Commission and including all amendments to this part as of April 14, 2011.

Executive Secretary

Nashville-Davidson County's Transportation Plan

Metropolitan Planning Commission

Adopted September 27, 2007

Amended April 14, 2011

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METROPOLITAN PLANNING COMMISSION
OF NASHVILLE AND DAVIDSON COUNTY, TENNESSEE

Resolution No. RS2011-32

"BE IT RESOLVED by The Metropolitan Planning Commission that 2011CP-000-002 is **APPROVED, including the addition of Lombardy Avenue to the Strategic Plan for Sidewalks and Bikeways. (8-0)"**

WHEREAS *Mobility 2030* was adopted by the Metropolitan Planning Commission on September 27, 2007 as the Transportation Functional Plan component of the General Plan of Metropolitan Nashville and Davidson County; and

WHEREAS, the *Nashville Strategic Transit Master Plan* was completed in 2009 and adopted by the Metropolitan Transit Authority and the update to the *Strategic Plan for Sidewalks and Bikeways* was completed by Metro Public Works in 2008; and

WHEREAS, Mayor Karl Dean issued the Complete Streets Executive Order on October 6, 2010, directing Metropolitan Government departments to "Give full consideration to the accommodation of the transportation needs of all users, regardless of age or ability...;" and

WHEREAS, incorporating the *Nashville Strategic Transit Master Plan* and the *Strategic Plan for Sidewalks and Bikeways* into *Mobility 2030* as elements of the Transportation Functional Plan component of the General Plan of Metropolitan Nashville and Davidson County further supports the principles of both Complete Streets and the complementary Context Sensitive Solutions approaches to transportation planning; and,

WHEREAS, countywide community meetings were held on October 26 and November 9, 2010 to discuss amending *Mobility 2030* to incorporate the *Nashville Strategic Transit Master Plan* and the *Strategic Plan for Sidewalks and Bikeways* into *Mobility 2030*; and

WHEREAS, a public hearing was held by the Metropolitan Planning Commission on February 24, 2011 to obtain additional input regarding the proposed changes; and

WHEREAS, the Metropolitan Planning Commission finds that the proposed changes are warranted;

NOW THEREFORE, BE IT RESOLVED, that the Metropolitan Planning Commission hereby ADOPTS Amendment No. 1 to *Mobility 2030*, the Transportation Functional Plan component of the General Plan for Metropolitan Nashville and Davidson County in accordance with Section 11.504(e) of the Charter of the Metropolitan Government of Nashville and Davidson County and a certified copy of *Mobility 2030* as amended is authorized to be filed with the Register of Davidson County, as required by Section 13-4-202, Tennessee Code Annotated.

James McLean /s/
James McLean, Chairman

Amendment Adoption Date: February 24, 2011

Attest
Richard C. Bernhardt /s/
Richard C. Bernhardt, Secretary and Executive Director

METROPOLITAN PLANNING COMMISSION
OF NASHVILLE AND DAVIDSON COUNTY, TENNESSEE

Resolution No. BL2007-301

"BE IT RESOLVED by The Metropolitan Planning Commission that 2007TP-01-CW is **APPROVED. (7-0)"**

WHEREAS *Mobility 2010* was adopted by the Metropolitan Planning Commission on July 30, 1992 as the Transportation Plan Functional Plan component of the General Plan; and

WHEREAS, the Metropolitan Planning Commission finds it necessary to update *Mobility 2010* to add new guiding principles as well as to make other needed revisions; and

WHEREAS, countywide community meetings were held on June 7, June 12, June 18, June 26 and July 11, 2007 to discuss the proposed changes; and

WHEREAS, a public hearing was held by the Metropolitan Planning Commission on September 27, 2007 to obtain additional input regarding the changes; and

WHEREAS, the Metropolitan Planning Commission finds that these changes are warranted;

NOW THEREFORE, BE IT RESOLVED, that the Metropolitan Planning Commission hereby ADOPTS the Guiding Principles of *Mobility 2030* and incorporates it as a Functional Plan component of the General Plan for Metropolitan Nashville and Davidson County in accordance with Section 11.504(e) of the Charter of the Metropolitan Government of Nashville and Davidson County.

James McLean
James McLean, Chairman

Date: September 27th, 2007 (Adoption Date)

Attest:

Rick Bernhardt
Rick Bernhardt, Secretary and Executive Director

Metropolitan Planning Commission

Mr. James McLean, Chairman
Mr. Phil Ponder, Vice-Chairman
Mr. Stewart Clifton
Ms. Judy Cummings
Ms. Tonya Jones
Ms. Ann Nielson
Mr. Victor Tyler
Mr. Derrick Dalton

Metropolitan Planning Department

Rick Bernhardt, Executive Director
Ann Hammond, Director of Planning
Jeff Lawrence, Director of Operations

Mobility 2030
Adopted
September 27, 2007

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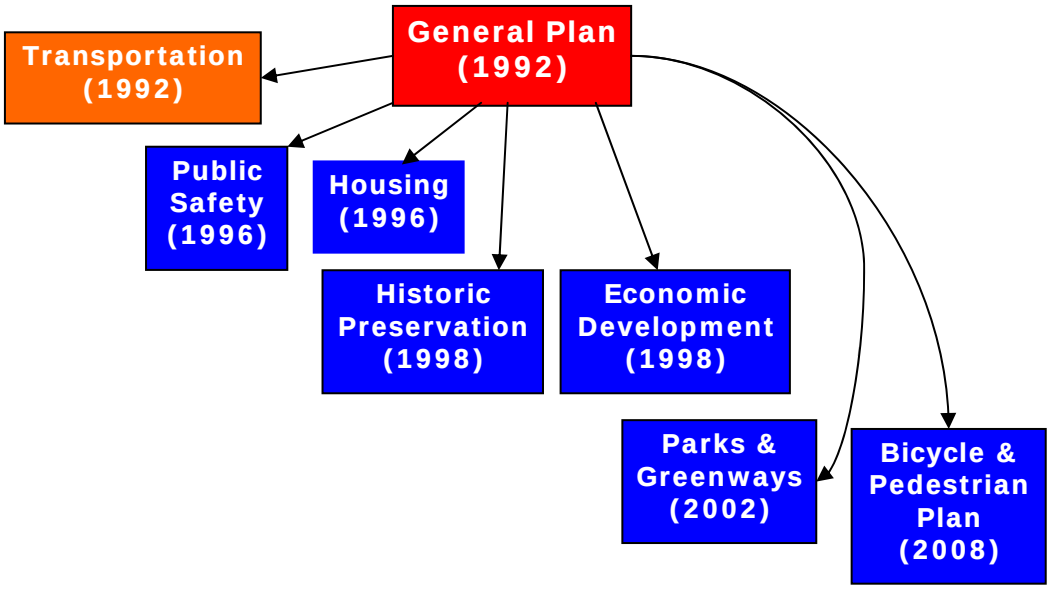
EXECUTIVE SUMMARY

What is *Mobility 2030*?

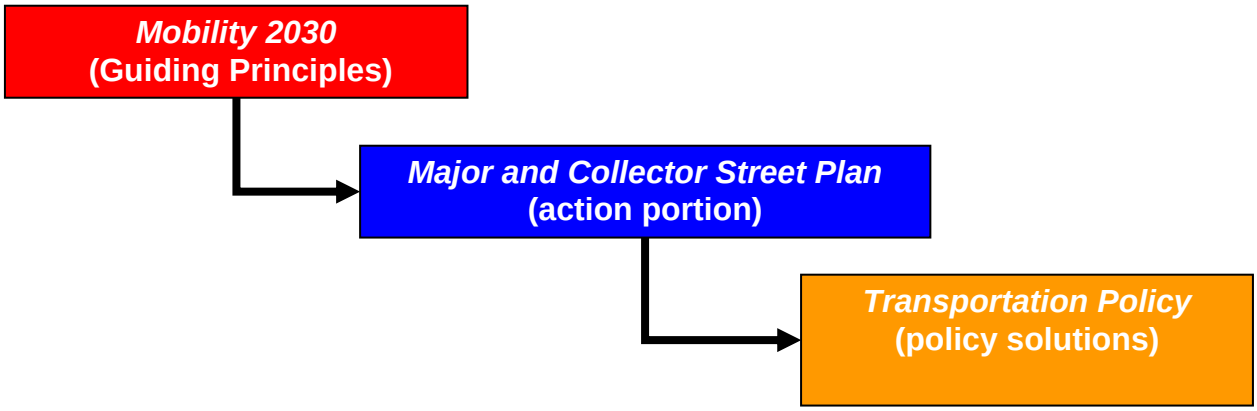
Mobility 2030 is one of the functional plans of the General Plan, which guides growth and development in Metro Nashville/Davidson County. *Mobility 2030* consists of five products. This first document outlines Guiding Principles – the philosophy with which all transportation decisions by public and private entities should comply. The Guiding Principles are used to create the second product – an update of the *Major and Collector Street Plan* (see diagrams below). The Guiding Principles also provide a basis for weighing future policy options for the city and creating a Transportation Policy document. In addition, two other documents that support the Guiding Principles are incorporated as elements of *Mobility 2030* - the *Nashville Strategic Transit Master Plan* prepared by the Metro Transit Authority (MTA) in 2009 and the *Strategic Plan for Sidewalks and Bikeways* prepared by the Metro Public Works Department (MPW) in 2003 and updated in 2008.

Guiding Principles (philosophy)
The General Plan guides growth and development in Metro Nashville/Davidson County. The General Plan, often referred to as *Concept 2010,* includes several related documents, with fourteen community plans and several functional plans. Functional plans include the transportation plan, *Mobility 2010*, which was last updated in 1992.



Mobility 2030 is an update of *Mobility 2010.* This update establishes Guiding Principles that address transportation and land use from a comprehensive view to:

- Ensure good working order of street, sidewalk, bicycle, transit and freight networks,
- Promote growth and development patterns that reduce trip lengths, and
- Provide transportation choices for people regardless of income, age or disability.



***Major and Collector Street Plan* (action portion)**
Once the Guiding Principles are established, they will influence the *Major and Collector Street Plan* update. In Fall 2007, work will begin on updating the *Major and Collector Street Plan*, based on Guiding Principles, with a Context-Sensitive Solutions (CSS) and Complete Streets approach.

CSS is a transportation/land use approach that:

- Involves and balances stakeholder needs
- Allows flexibility in design guidelines and standards
- Designs a transportation system and individual roads that serve all users regardless of travel mode

The Complete Streets approach:

- Results in streets that are designed and operated to enable safe access for multiple users
- Uses policies that direct transportation planners and engineers to consistently design with all users in mind
- Does not result in a single design prescription for complete streets
- Balances safety and convenience for everyone using the road

Transportation Policy (Zoning, Subdivision and Metro Policy Amendments)
Discussion generated by the adoption of the Guiding Principles and update of the *Major and Collector Street Plan* will likely result in policy changes proposed to the Metro Council and Metro Departments. These could take the form of changes to zoning code, subdivision regulations and policies in how Metro Government handles its own transportation needs.

Why is *Mobility 2030* necessary?

State and local law recognize the need for orderly development and charges planning commissions with creating community plans. Land use planning and transportation planning are intricately connected, making a transportation plan an important component of planning for orderly and more predictable development.

Additionally, the plan is necessary because transportation decisions are crucial to Nashville/ Davidson County's long-term economic, social and environmental sustainability. While the link between effective mobility and economic development is clear, the General Plan and, increasingly, community stakeholders, demand that the impact of transportation choices on the environment and on the health of communities be considered as well. *Mobility 2030* considers land use objectives, mobility objectives, desired rural, suburban and urban development patterns and the built and natural environment to effectively shape Metro's transportation system.

How was *Mobility 2030* created? What are its impacts?

This plan takes its direction from four main sources:

1. **Existing Plans** – Nashville area transportation and land use plans

2. **Best Practices** – Innovative land use and transportation practices from other cities/regions

3. **Existing Conditions and Future Trends** – Existing conditions and future forecasts for demographics, funding, etc.

4. **Public Involvement**– Community involvement through meetings, e-mail and other communication were considered as this plan was drafted.

Because growth and development decisions have long-lasting impacts, the guiding principles are useful for private (developers, property owners, residents) and public (elected officials and government agencies) stakeholders in linking land use and transportation choices. This plan:

- **Establishes a long-term vision** (15 to 20 years)

- **Provides guidance for officials making Metro-funded infrastructure decisions**
  - providing services and facilities to support development
  - prioritizing investments to make efficient use of public funds

- **Informs private-sector transportation improvement decisions through zone changes and subdivision requests**

Guiding Principles and Proposed Strategies

Although each guiding principle lists proposed strategies for their success, stakeholders are encouraged to offer additional strategies if they demonstrate how their development proposals meet the guiding principles. "Guiding Principles and Proposed Strategies" are explained in greater detail later in the document, and also reflect information from "Existing Conditions and Future Trends." The Guiding Principles offered in this document are as follows:

1. **Create Efficient Community Form**
2. **Offer Meaningful Transportation Choices**
3. **Sustain and Enhance the Economy**
4. **Value Safety and Security**
5. **Protect Human Health and the Environment**
6. **Ensure Financial Responsibility**
7. **Address Transportation from a Regional Perspective**

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INTRODUCTION

What is Mobility 2030?

Planning in Metro Nashville/Davidson County is guided by a General Plan that establishes guidelines for growth and development. Given the complexity and diversity of development in Nashville/Davidson County, the General Plan is actually a group of related documents with fourteen community plans and several functional plans. Functional plans include the transportation plan, *Mobility 2010*, last updated in 1992. This update of *Mobility 2010* outlines guiding principles and supporting strategies to support the General Plan by integrating land use and transportation options that:

- Ensure good working order of street, sidewalk, bicycle, transit and freight networks;
- Advance growth and development patterns that reduce trip lengths;
- Provide transportation choices for people regardless of income, age or disability.

Why is Mobility 2030 necessary?

State law recognizes the need for orderly development and charges planning commissions with the responsibility of creating community plans. Tennessee Code Annotated 13-3-301 (T.C.A. 13-3-301) states:

"It is the function and duty of a regional planning commission to make and adopt a general regional plan for the physical development of the territory of the region."

T.C.A. 13-4-201, Municipal Planning, states:

"The plan, with the accompanying maps, plats, charts, and descriptive and explanatory matter, shall show the commission's recommendations for the physical development, and may include, among other things, the general location, character and extent of streets, bridges, viaducts…"

Local law echoes state law, as the Code of the Metropolitan Government of Nashville and Davidson County lists the Metropolitan Planning Department's powers and responsibilities in chapter five of Metro's charter, Section 11.504, which include the following directly related to transportation:

- "Make, amend and add to the master or general plan for the physical development of the entire metropolitan government area."
- "Exercise control over platting or subdividing of land within the metropolitan government area."
- "Draft for the council an official map of the area and recommend or disapprove proposed changes in such map."
- "Make and adopt plans for the replanning, conservation, improvements and renewal of neighborhoods, planning units and communities within the metropolitan government area."

Perhaps more importantly, a transportation plan is necessary because transportation decisions are crucial to Metro's long-term economic, environmental and social sustainability. While the link between effective mobility and economic development is clear, the General Plan and, increasingly, community stakeholders, demand that the impact of transportation choices on the environment and on communities be considered as well. *Mobility 2030* considers land use objectives, mobility objectives, desired rural, suburban and urban development patterns and the built and natural environment to effectively shape Metro's transportation system.

How does Mobility 2030 work?

Recognizing the many demands on Metro's transportation system, as well as finite resources and competing goals, *Mobility 2030* provides long-term guiding principles for land use choices and investments that effectively link and enhance transportation. Additionally, *Mobility 2030* acknowledges the overarching vision heard throughout community planning in Nashville/Davidson County – that residents value a diversity of development and subsequent diversity of residential and lifestyle choices, and want land use and transportation policies that balance these and the community's mobility needs.

This plan draws upon four main sources (see Appendix A for complete list of plans reviewed):

1. **Existing Plans**
   In keeping with the Guiding Principle of regionalism and Nashville's role in Middle Tennessee, this plan addresses larger regional and state plans like the Nashville Metropolitan Planning Organization's (MPO) *2030 Long Range Transportation Plan*, the Tennessee Department of Transportation's (TDOT) *2030 Long Range Transportation Plan* and Cumberland Region Tomorrow's *Quality Growth Toolbox*.

2. **Best Practices**
   Innovative land use and transportation strategies, often backed by dedicated funding, are present in other communities and offer Metro Nashville/Davidson County ideas to draw upon. Two examples of plans this one draws on are Charlotte, North Carolina's *2030 Transit Corridor System Plan* and Denver, Colorado's *Blueprint Denver*, which both take an integrated approach to land use and transportation.

3. **Trend Analysis**
   See the "Land Use and Transportation Trends" section below for a summary of existing conditions and future trends for a number of factor affecting the transportation system.

4. **Public Input**
   Community involvement stemming from public meetings and communication via e-mail, phone calls and letters was considered as the plan was drafted.

EXISTING CONDITIONS AND FUTURE TRENDS

Land Use

Why It Matters: Efficient land use creates responsible investments, creates a diversity of uses and designs for active living and better community health.

Guiding Principles It Serves: Create Efficient Community Form, Offer Meaningful Transportation Choices, Ensure Financial Responsibility, Sustain and Enhance the Economy

Existing Conditions
Cumberland Region Tomorrow (CRT), a regional planning organization addressing growth in Middle Tennessee's 10-county region, reported in 2003 that the average density of the 52 largest metropolitan areas nationwide was 4.7 people per acre, while Nashville's regional population density (urban, suburban, and rural residential areas combined) was 2.7 people per acre, or 60 percent of the national average.[1] Development trends through the 1990s showed an average of one acre of land being developed for every 1.41 people of population increase.[2]

Between 1990 and 2000, Nashville/Davidson County gained almost 60,000 people, an 11 percent increase, and as of 2005, had just over 600,000 people. Much of this growth occurred in Bellevue and southeastern Davidson County, while infill growth (ex. vacant lots, redeveloped industrial sites, etc.) was limited. Given these growth patterns, CRT modeled the impact of continuing these patterns (Base Case) versus a more compact approach to growth (Alternative Case), shown in Table 1.

Table 1: Cumberland Region Tomorrow Growth Scenarios[3]

Indicator	Base Case	Alternative Case
Land growth will consume	365,000 acres	91,000 acres
Infrastructure costs	$7 billion	$3.5 billion
New road miles	4,500 miles	2,200 miles
Acres of new impervious surfaces	62,000 acres	35,000 acres
Vehicle miles of travel increase	39 miles	36
Density patterns - regionwide	1 person per acre	6 persons per acre

[1] *A Report to the Region*, 2003, Cumberland Region Tomorrow, 5.
[2] Ibid, 7.
[3] All amounts rounded for simplicity: Infrastructure, $6,957,085, 995 (Base), $3,406,798,045 (Alt.), New road miles, 4,544 miles (base), 2,225 miles (Alt.), Acres of new impervious surface, 62,444 acres (Base), 35,033 acres (Alt.), VMT, 39 miles (Base), 35.9 (Alt.), Density, 1.13 (Base), 5.8 (Alt.)

Future Trends

As of 2003, 510,342 acres of the 3.4 million acres land supply in the Cumberland Region, or 15 percent,[4] was "developed." The term "land supply" assumes developable land, which is often existing farm and forest land. With 467,181 new people forecasted for the Cumberland Region by 2030, the density of recently built housing suggested that if the current growth pattern continued (

Figure 1), an additional 365,000 acres of land would be developed (25 percent of the 3.4 million acre total), putting the average density at 1 person per acre. To put this in perspective, Davidson County's entire land area (excluding bodies of water) covers almost 337,000 acres.

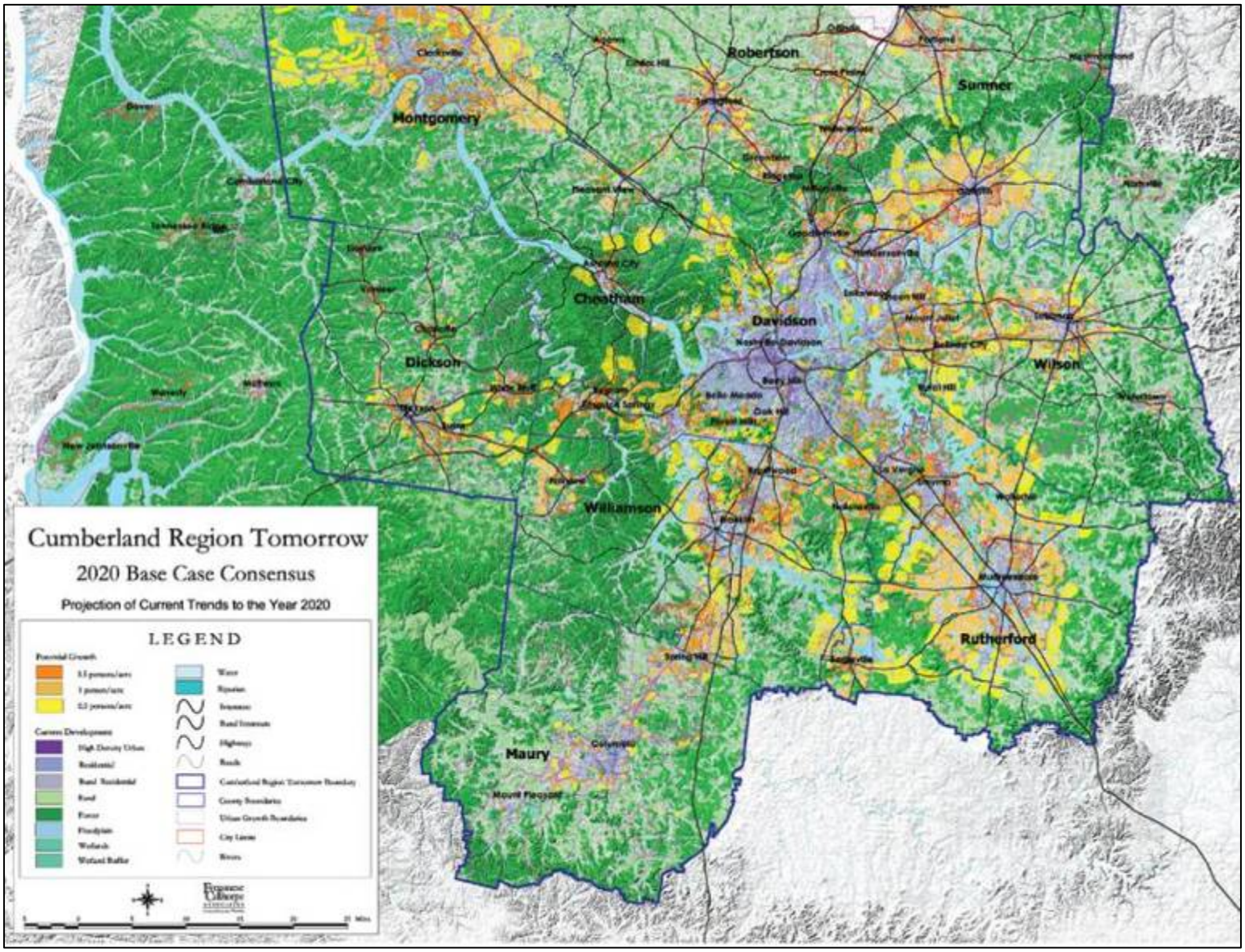


Figure 1: CRT Base Case Scenario Map

[4] Davidson, Sumner, Wilson, Rutherford, Williamson, Cheatham, Robertson, Montgomery, Maury, Dickson County

Looking closer at Nashville/Davidson County, its population is projected to grow 20,000 people every five years between now and 2025.[5] CRT's alternative growth scenario[6] (Figure 2) estimated that 91,000 acres of land would be developed and result in a density increase to 6 people per acre. Given the projected growth, if cities selectively increase their densities, they can conserve land, attract and better support shopping and employment opportunities and create meaningful transportation options.

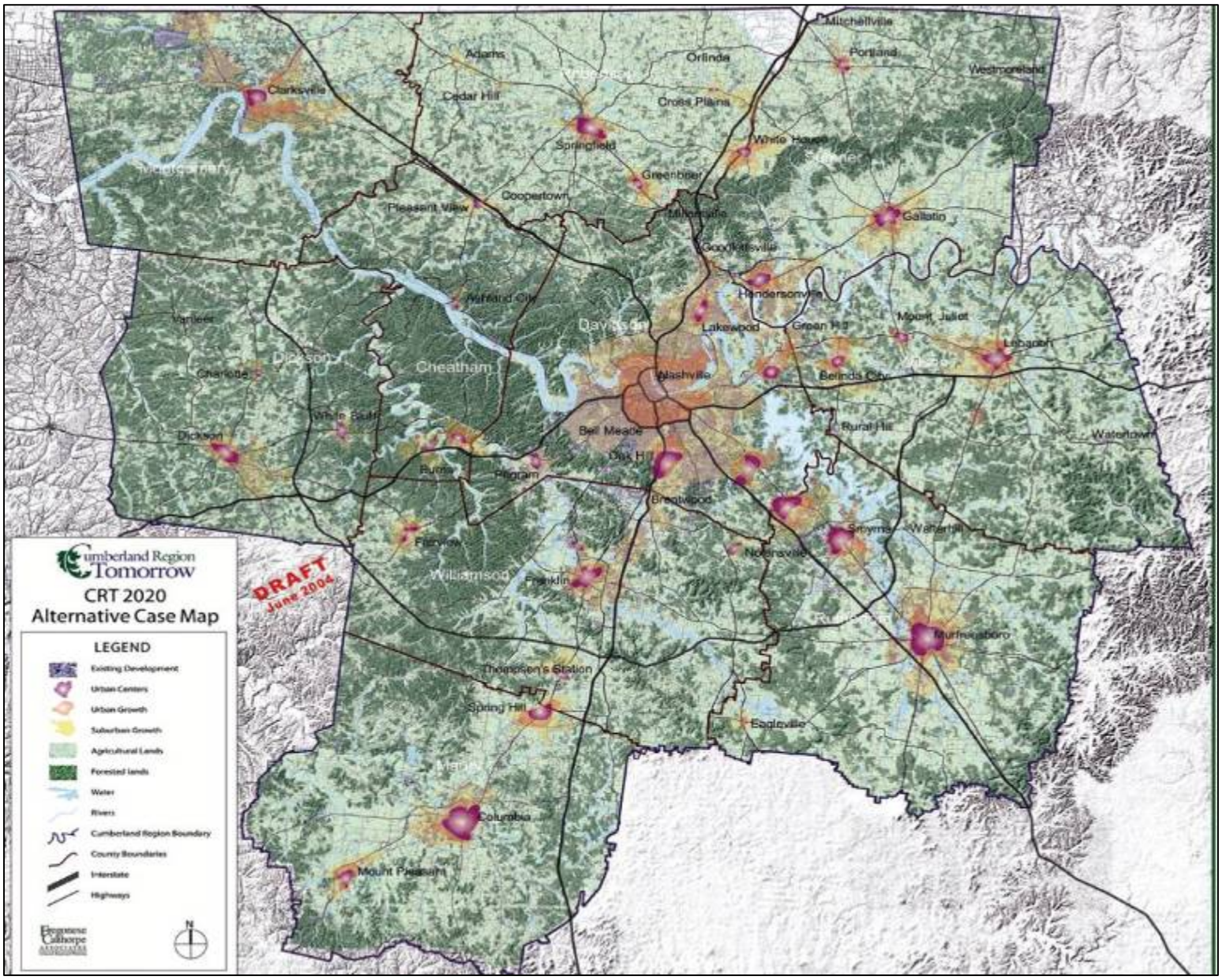


Figure 2: CRT Alternative Growth Scenario

[5] Tennessee Advisory Commission on Intergovernmental Relations (TACIR), http://www.state.tn.us/tacir/population.htm

[6] This scenario assumed greater density, a variety of building types and a more equal distribution between greenfield, greyfield, brownfield and infill development.

Street Connectivity

Why It Matters: Network connectivity can more easily distribute traffic, create block systems that are human-scaled to encourage walking, reduce trip distances and increase route choices for all modes of transportation.

Guiding Principles It Serves: Create Efficient Community Form, Offer Meaningful Transportation Choices, Value Safety and Security, Ensure Financial Responsibility

Existing Conditions
Nashville/Davidson County's transportation system is largely established in existing streets, waterways (Cumberland River) and railroad lines, yet the allocation of right-of-way within them may change in the future. While highways, rail lines and the Cumberland River are important for moving freight, surface streets are a widespread and crucial part of our transportation system for moving people. Over the last 50 years, street design and connectivity have focused heavily on the automobile. Until World War Two, most of Nashville's streets formed a well-connected grid. With suburban growth, development has increasingly funneled traffic onto existing major streets rather than increasing the transportation network with new, connected arterial and collector streets.

These two distinctive street networks are generally identified as *traditional* (pre-1945) and *conventional* (post-1945) and Table 2 highlights their advantages and disadvantage centered on local streets.

Table 2: Attributes and Examples of Street Networks

East Nashville, with Shelby Park at right

Mt. View Rd. area east of Murfreesboro Pike, with Percy Priest Lake at right

	Trade-offs	
Traditional Street Network	Spreads traffic rather than concentrating it on a limited number of streets, which reduces the impacts of high traffic volumes on residential collector streets	Spreads traffic, with some of it moving over local residential streets.
	Provides more direct routes, which generate fewer vehicle miles traveled (VMT) than contemporary suburban networks	
	Supports walking and biking with direct routing and options to travel along high or low-volume streets	
	Supports transit because it offers users relatively direct walking routes to transit stops	
	Creates a block structure where land use can evolve and adapt over time, which provides development flexibility	
	Allows for frequent traffic signals which can be synchronized to provide a consistent speed and safe pedestrian crossings	Requires high density of collector streets
Conventional Street Network	Reduces through-traffic in neighborhoods, resulting in lower traffic volumes on local streets	Concentrates local traffic onto a handful of arterial and collector streets, in addition to Interstate highways intended for through-traffic, adding to congestion
	Create fewer intersections, thus fewer conflict points and lower accident rates	
	Creates some very low-volume streets and cul-de-sacs, which are desirable to many residents	

Future Trends

Connectivity is paramount in development and redevelopment. While connectivity in local streets has been improved in recent development, the addition of new collector and arterial streets is lacking. A healthy street network must provide collectors and arterials at regular intervals to distribute congestion from existing collectors and arterials.

Connectivity will not always take the form of a strict grid. A modified grid and curvilinear streets may be appropriate given the topography and community character. Meanwhile, for existing streets, consideration should be given to reallocating right-of-way to better support multi-modal transportation and provide a variety of land uses.

New suburban growth and infill redevelopment offer opportunities for creating new streets and reconfiguring existing ones (especially in the absence of heavily developed land) that accommodate multiple modes and have good connectivity. Lenox Village, a traditional neighborhood development in southeastern Davidson County, illustrates this in relation to its surrounding suburban growth. The street grid works with the rolling topography while maintaining good connectivity within the neighborhood and to the larger street network.

Figure 3: Lenox Village (traditional street grid at right) next to Nolensville Pike (running north-south at center) compared to cul-de-sac patterns in surrounding development

In creating improved connectivity, decision makers should consider the following:

1. **Traffic: Speed vs. Volume** – Would people tolerate traffic volumes in neighborhoods if on-street parking, street trees, pavement markings and other traffic calming techniques kept traffic moving at comfortable speeds? (ex. less than 30 miles per hour)

2. **Concerns about security and safety** – Would people allow more street connectivity if they equated it with:
    - **a.** Active street life (more pedestrians generated by shorter route distances, "eyes on the street" from porches, storefronts, etc.)
    - **b.** Better access for emergency responders (multiple street connections vs. one or two)

3. **Street Spacing Standards** – Major streets (arterials and collectors) should generally be placed one half-mile or less from one another in urban areas, with one to two mile intersection spacing suitable for lower density, suburban and rural areas. By creating a dense network of streets, major streets can distribute traffic with a maximum of four travel lanes, striking a balance between vehicle mobility and pedestrian access across streets to adjacent property.[7]

Travel Patterns

Why It Matters: Commuting to work increasingly makes up a smaller portion of all trips, so other travel needs are important to consider as well.

Guiding Principles It Serves: Address Transportation from a Regional Perspective, Offer Meaningful Transportation Choices, Sustain and Enhance the Economy

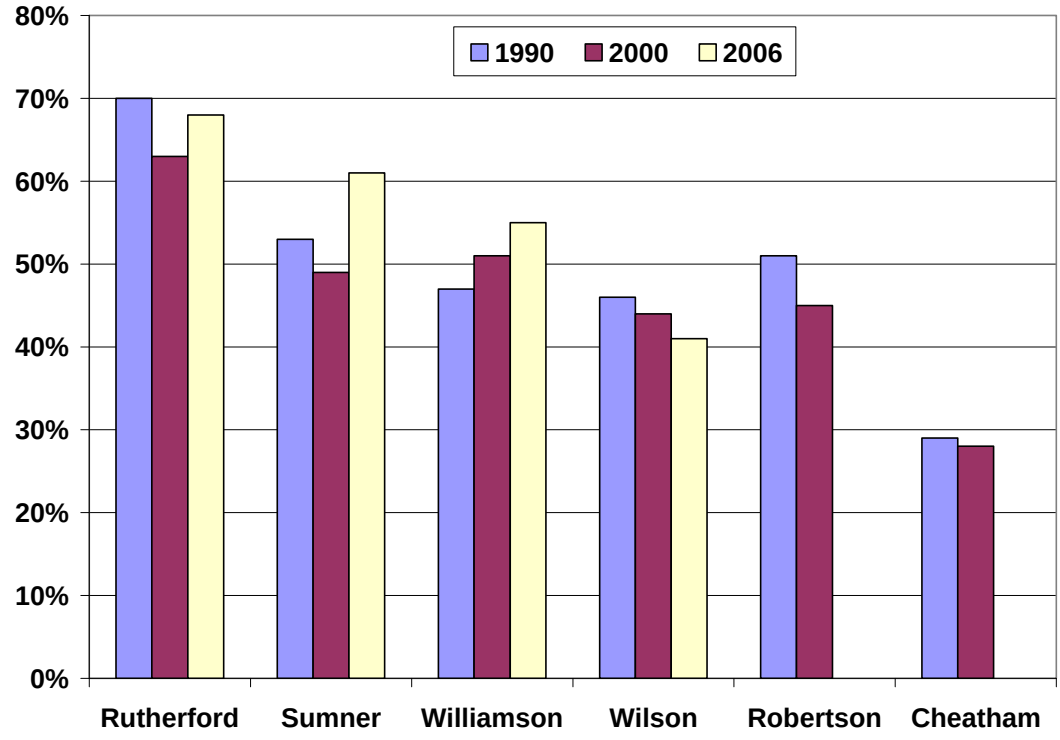
Existing Conditions

Transportation planning is more challenging now since travel patterns have changed over the last 30 years, while planning and funding priorities have adapted to these changes slowly. Locally, the percentage of suburban residents who work in their home county is rising while the share that commute into Davidson County is falling.[8] (Table 3 and Table 4).

[7] Reid Ewing. "Sketch Planning a Street Network," *Transportation Research Record 1722*, 2000. pp. 75-79.
[8] Source: U.S. Census Bureau, Wilkerson and Associates

Table 3: Percentage of Suburban County Residents Who Work in Davidson County (2006 data unavailable for Robertson, Cheatham County)

Table 4: Percentage of Suburban County Residents Who Work In Home County



Every suburban county except Wilson County has seen a higher percentage of its residents working in their home county since 1990, suggesting a shift toward a "jobs-housing balance" (ex. people living closer to where they work). This reflects a general decentralization of industries and the jobs they provide across metropolitan regions. Although Wilson County has seen increasing numbers of its residents working outside the county, its residents who work in Davidson County now have commuter rail transportation in addition to Interstate 40 and Lebanon Pike.

How people get to work is still an issue, but commuting has declined as a share of all vehicle trips – from nearly 33 percent in 1969 to less than 17.5 percent today. This is not because there are fewer work trips, but because of the increase in trips for other purposes, such as shopping and recreation.[9]

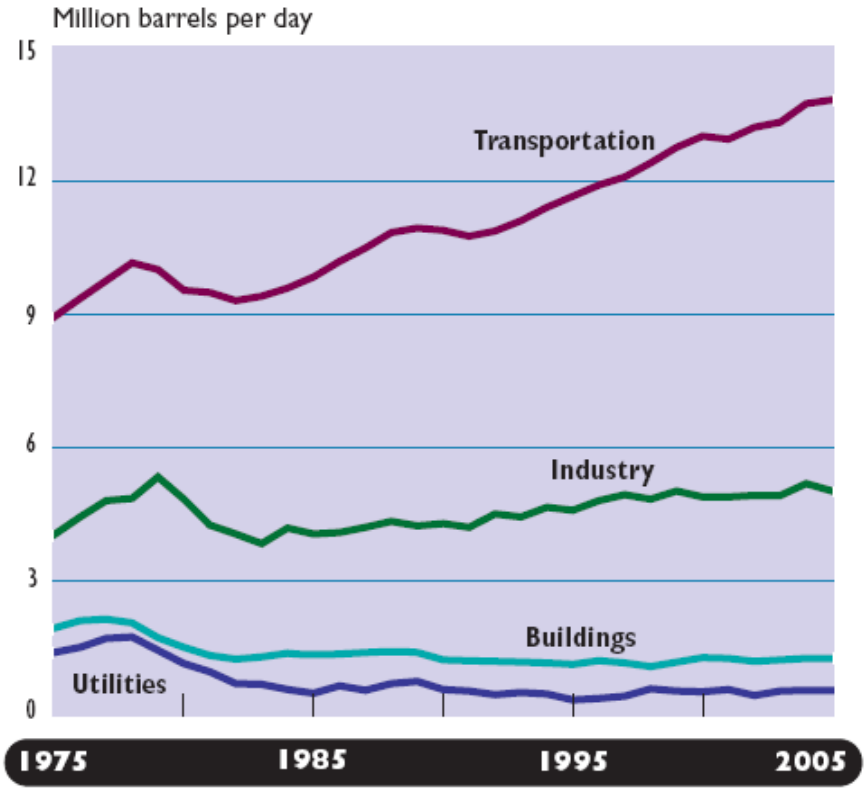
Given this trend, it is important to look beyond just commuting trips as a basis for transportation system decisions by using a common transportation measure – vehicle miles traveled (VMT) per capita. Simply put, VMT is the daily mileage an average person travels by vehicle per day. Generally, higher VMT indicate that people are driving further to get where they need to go, using more fuel and potentially having a negative impact on the environment. As of 2000, metropolitan Nashville's VMT per capita was 31 miles, which reflected the spread out nature of the region. Three primary factors behind VMT growth are: longer trip distances, less carpooling, and busier lifestyles than in the past. Development patterns (ex. long blocks, disconnected street networks) that require an automobile trip for every errand tend to require more driving to accomplish the same tasks.

[9] National Household Travel Survey, http://nhts.ornl.gov/index.shtml, 2001.

Future Trends

Although motor vehicle emissions of most air pollutants have declined since 1970 due to improved technologies and cleaner fuels, VMT growth threatens to reverse this trend. Table 5 illustrates the corresponding demand for oil to support this increase, which may be on an unsustainable upward trend.

Table 5: Transportation's Share of U.S. Oil Use Compared to Other Uses: 1975-2005[10]



In their base-case scenario[11], Cumberland Region Tomorrow projected that vehicle miles traveled (VMT) per person would rise to 39 miles per day versus a VMT drop to 35.9 miles under the alternative growth scenario. Even if Middle Tennessee switched to zero-emission vehicles, increasing dependence on driving would worsen congestion. Since an immediate conversion to zero-emission transportation systems is unlikely, a drop or stabilization of VMT could be attained through more transportation options and land uses in closer proximity to each other, ultimately fostering cleaner air.

[10] U.S. Department of Energy, Energy Information Administration, *Annual Energy Review 2005* (Washington, DC: July 2006), tables 5.13a-d, page 33, *FHWA Pocket Guide to Transportation - 2007*

[11] This assumed that development patterns through 2025 would continue recent trends.

Demographics

Why It Matters: Changing populations create changing transportation demand.

Guiding Principles It Serves: Address Transportation from a Regional Perspective, Offer Meaningful Transportation Choices, Sustain and Enhance the Economy

Existing Conditions
The Cumberland Region[12] expects to add almost 470,000 people by 2030, with Davidson County absorbing about 100,000 of those people by 2025. In addition to how many people Nashville/Davidson County adds and where they live/travel, it is also important to consider *who* they are, because this also impacts travel patterns. In 2005, 21 percent of the population was 55-and-older. In a 2004 national survey, more than half of non-drivers aged 65 and older stayed home because their transportation choices were limited and 71 percent of older households said they would prefer to live within walking distance of transit.[13]

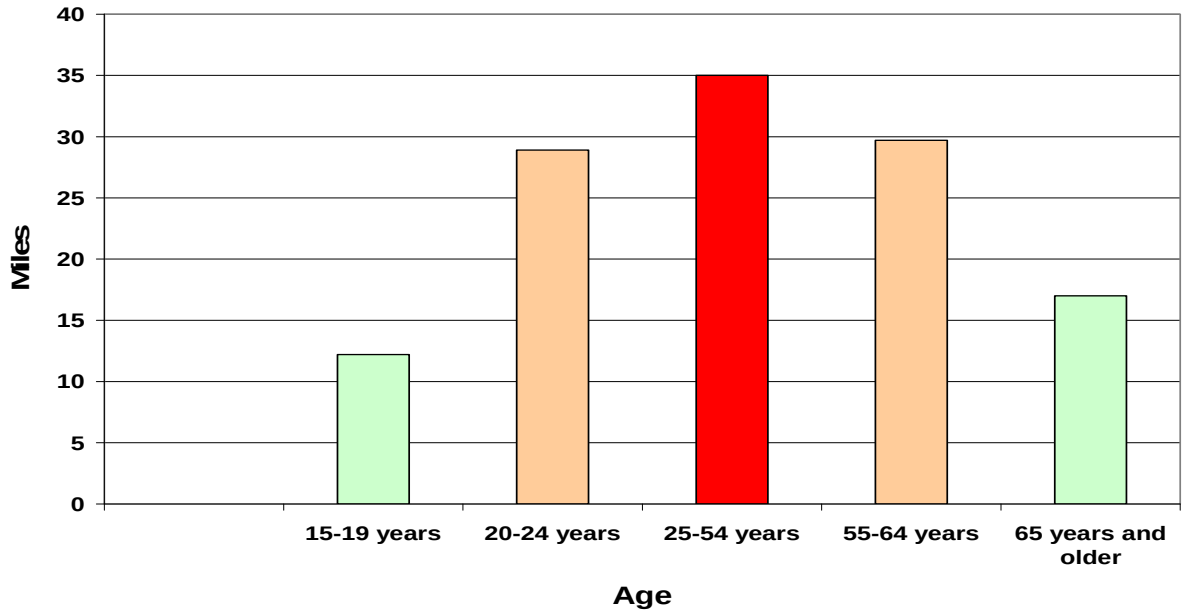
In 2005, 40 percent of county households were non-family households,[14] which have transportation implications cited below.

Future Trends
By 2025, 27 percent of Nashville/Davidson County's population is projected to be 55-and-older, reflecting the coming "Senior Boom," as Baby Boomers (people born between 1946 and 1964) age and retire. If projections hold steady, the number of 55-and-older residents will grow more than twice as fast as the county's population as a whole (69 percent, 55-and-over growth vs. 15 percent, overall growth). This trend will also contribute to an increasing proportion of single-person and non-family households. Transportation implications of increasing non-family households include a demand for smaller and more variable housing types, in addition to transportation options to serve them.

[12] Davidson, Sumner, Wilson, Rutherford, Williamson, Cheatham, Robertson, Montgomery, Maury, Dickson County.
[13] Linda Bailey. "Aging Americans Stranded Without Options," April 2004, *Surface Transportation Policy Project*, www.transact.org.
[14] The U.S. Census Bureau defines a non-family household as a household maintained by a person living alone or with non-relatives.

As people age, their trips tend to become shorter and less frequent, with a significant reduction occurring when they retire and no longer commute.[15]

Table 6: Average Miles Driven Daily by Age Group



As the Baby Boom retires their per capita vehicle travel will likely decline, and the demand for alternative transportation modes and more accessible housing locations is likely to increase.[16] If people wish to "age in place," (live in the same community or neighborhood that they raised a family or spent their career in), then people will need more housing and transportation options in proximity to their existing ones.

Freight and Passenger Movement

Why It Matters: Ensuring the reliable movement of people and goods keeps existing businesses healthy and helps attract new ones.

Guiding Principles It Serves: Address Transportation from a Regional Perspective, Offer Meaningful Transportation Choices, Sustain and Enhance the Economy, Value Safety and Security

Existing Conditions

Nashville/Davidson County's central location (within 650 miles of half of U.S. population) and good access, including three Interstate highways, the Cumberland River barges, CSX Transportation train yards and Nashville International Airport) makes it an important part of the nation's freight system. Every year, over 300 million tons of freight ranging from auto parts to

[15] Table A-17, BTS (2003), *NHTS 2001 Highlights Report, BTS03-05*, U.S. Department of Transportation, Bureau of Transportation Statistics (www.bts.gov)

[16] American Association of Retired Persons (AARP), *Livable Communities: An Evaluation Guide*, AARP Public Policy Institute (http://assets.aarp.org), 2005.

medical supplies pass through Nashville/Davidson County. Trucking has steadily reduced shipping costs and increased speeds, while container-shipping, intermodal yards, deregulation and other logistical changes have particularly influenced long-distance travel.

Trucking

With 12 million annual through truck trips, Nashville/Davidson County is one of the top ten metropolitan regions for truck traffic. While the average urban area experiences 30 percent of truck traffic as through-traffic, 73 percent of Nashville's truck traffic is through-traffic, meaning Nashville is likely to remain a shipping center in the coming years.

Figure 4 shows the current reliance on trucks for most freight movement. Most freight moves through Nashville rather than having its origin or destination here. Still, shipping and distribution centers have developed in the area because of its central location.

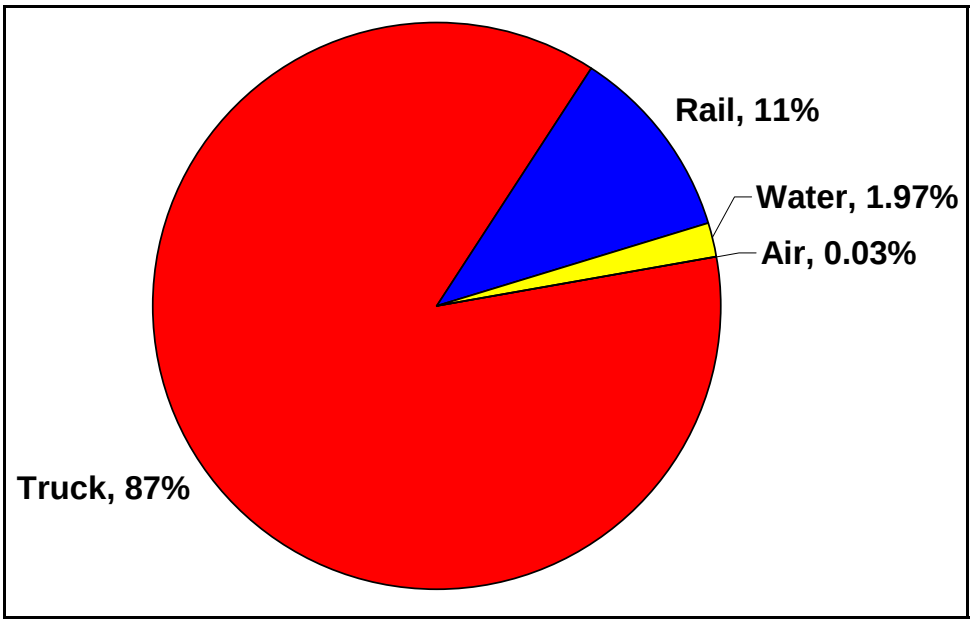


Figure 4: How Freight Moves Through Metropolitan Nashville
Source: *Nashville Regional Freight and Goods Movement Study*, Nashville MPO, 2004.

Rail

A single Class I railroad, CSX Transportation, serves Nashville/Davidson County, with most freight moving through Nashville rather than having an ultimate destination here. Nashville's relatively close proximity (less than 500 miles) to other major railroad hubs restricts the region's opportunities for significantly shifting road freight to rail. Of the three key Interstate highway corridors in Nashville, all are constrained in regard to rail:

1. **I-40**: There is no through rail line east from Nashville to Knoxville to compete with trucks on I-40, and the line west reaches the gateway at Memphis, a more dominant rail hub than Nashville.

2. **I-24**: The rail line parallel to I-24 is 300 miles between Nashville and a gateway at St. Louis, a more dominant rail hub than Nashville.

3. **I-65**: The rail line parallel to I-65 is 475 miles between Nashville and a gateway at the Chicago.

Nashville is a key hub in the CSX system, routing sixty trains per day through the Nashville area toward five key cities: Atlanta, Birmingham, Chicago, Louisville, and Memphis. Forty of these trains simply pass through; the rest are hubbed in a classification yard, with the majority of railcars sent out again on a different train line - much like airline passengers change planes in an air hub.

In terms of passenger rail, Nashville's Amtrak service ended in 1978 and the closest existing service is in Louisville. Aside from the existing Music City Star commuter rail service (operating on a locally-owned railroad line), future commuter rail lines would have to operate on CSX tracks, which currently have limited freight capacity due to single-track sections and constrained right of way in places.

Air

Most of Nashville's air cargo ultimately moves via trucks heading 175 miles north on I-65 to United Parcel Service's (UPS) Louisville hub or 215 miles west on I-40 to FedEx's Memphis hub. Still, Nashville International Airport's air cargo terminals handle an average 70,000 tons of freight per year, aiding companies like Dell with "just-in-time" supply chains. Auto manufacturers also occasionally depend on air cargo to keep assembly lines moving. Looking at yearly snapshots from December 2001 to 2005, Table 7 shows that air cargo increased 82 percent during that time, with passenger growth at 22 percent. As of 2000, the airport handled 4.5 million passengers and 64,700 tons of air cargo.[17]

Table 7: Recent Increase in Nashville Air Cargo[18]

Aviation activity

Nashville International airport	*Dec.2001*	*Dec.2002*	*Dec.2003*	*Dec.2004*	*Dec.2005*	*Dec. 2001 - 2005*
Total passengers	615,850	666,323	654,830	687,681	749,925	**22%**
Air cargo and freight (tons)	3,386	4,615	5,883	6,308	6,166	**82%**

17Nashville's 30-Year Aviation Plan, http://www.nashintl.com/about/thirty_year_plan.aspx

[18]Business and Economic Research Center (BERC), Middle Tennessee State University, http://www.mtsu.edu/berc~indicators.htm.

Water

Figure 5: Barge moving coal and gravel, Cumberland River (Photo by Gregory Thorp, © Ingram Barge Company)

Ninety percent of Nashville's water freight is inbound, including coal for power plants and construction materials like gravel and bricks. The remaining 10 percent that is outbound is mostly sand and gravel. Aside from personal watercraft, the main passenger-carrying water transport in Nashville is *The General Jackson* riverboat. It provides a slower, tourist-oriented travel option between Downtown and the Opryland Area and carries 250,000 passengers per year.

Future Trends

Trucking

Future savings gained through computer automation and container shipping will be outpaced by increased fuel prices. Because of this trend, reliance on truck shipping should shift to a broader base to improve economic and environmental sustainability. In fact, freight traffic moving via all modes is expected to increase more than 70 percent by 2030,[19] so expecting trucks to support the majority of that increase may not be sustainable.

[19] FHWA Freight Analysis Framework, accessed 3/19/07, http://ops.fhwa.dot.gov/freight/freight_analysis/state_info/tennessee/profile_tn.htm#fig4

Rail

Rail traffic is projected to increase 50 percent over 2002 levels by 2020, so corridor improvements are needed for rail to be a viable freight mode.[20] These include completing Tennessee's east-west rail gap (Figure 6), which currently prevents a rail alternative for freight or passengers moving east-west on Interstate 40. A 2003 study found that building a basic freight connection (Figure 7) would cost almost $120 million. An alternative (Figure 8) proposed a new, straighter route and had the potential of diverting 20 percent of truck traffic onto rail. The estimated total cost was estimated at $1.2 billion, or $842 million in capital costs alone.[21]

Figure 6: Tennessee's Existing Rail System,
Source: TDOT/Carter-Burgess, 2003.

Figure 7: Basic Freight Rail Connection

Figure 8: Planning Horizon Concept Alignment

[20] TDOT. *Tennessee Rail System Plan: Summary, Funding Options, and Rail Program Recommendations*, October 10, 2003, iii-v.
[21] Ibid.

Air

Air cargo will continue to be an important mode for lighter-weight, yet high-value goods such as electronics and pharmaceuticals. In order to move cargo to and from the airport, good road access from the airport's cargo hub to the region should be ensured, with Interstate 40, Briley Parkway, Murfreesboro Road and Donelson Pike congestion being key indicators of the airport's cargo reliability.

Figure 9: Nashville International Airport and surrounding surface transportation routes serving freight movement

If freight tonnage reaches at least 200,000 tons per year and passenger volumes double to 9.5 million passengers per year, the Nashville International Airport's master plan recommends a fifth runway east of Donelson Pike proposed for construction between 2013 and 2023.[22]

Water

Long-term shipping improvements should be made if water freight is going to be a viable alternative freight mode in and through Nashville/Davidson County. For comparison, a single 1,500 ton barge can carry the same amount of materials as 60 fully loaded trucks,[23] so its efficiency of scale alone makes it a more sustainable freight option. Still, the main constraint on both freight and passenger movement via water is the need for immediate proximity of an intermodal transfer point (ex. barge to rail, ferry to bus) and proximity of housing or activity centers to ferry stations. Other constraints include speed and indirect routing due to the meandering nature of the river.

[22]Nashville's 30-Year Aviation Plan, http://www.nashintl.com/about/thirty_year_plan.aspx
[23] Nashville MPO/Wilbur Smith Associates. *Nashville Regional Freight and Goods Movement Study, Final Report*, December 2004, 15.

Barge transportation has traditionally been viable for bulky, inexpensive goods (gravel, cement, grain) yet there is potential for its use in higher-value products. Container-on-barge, or COB, is a future trend that creates the potential to ship higher-value goods that currently transfer/ship via rail and truck. While the just-in-time aspect of COB (Figure 10) is not as competitive with rail or truck, the energy efficiency of it could make it an increasingly important shipping mode in light of rising energy prices.

Figure 10: Container-on-barge, COB

In trying to balance freight and passenger movement, and improved water quality, the understanding of the "best use" of the river is changing. The recent Riverfront Redevelopment Plan emphasizes a mix of uses, with particular emphasis placed on recreation and entertainment. Transportation and recreation uses will ultimately need to balanced for the Cumberland River to be a "working river" and the city's "living room."

Transportation Funding

Why It Matters: Federal and state transportation funds are generally limited or declining, so Nashville/Davidson County will need to prioritize its transportation investments and consider more local funding.

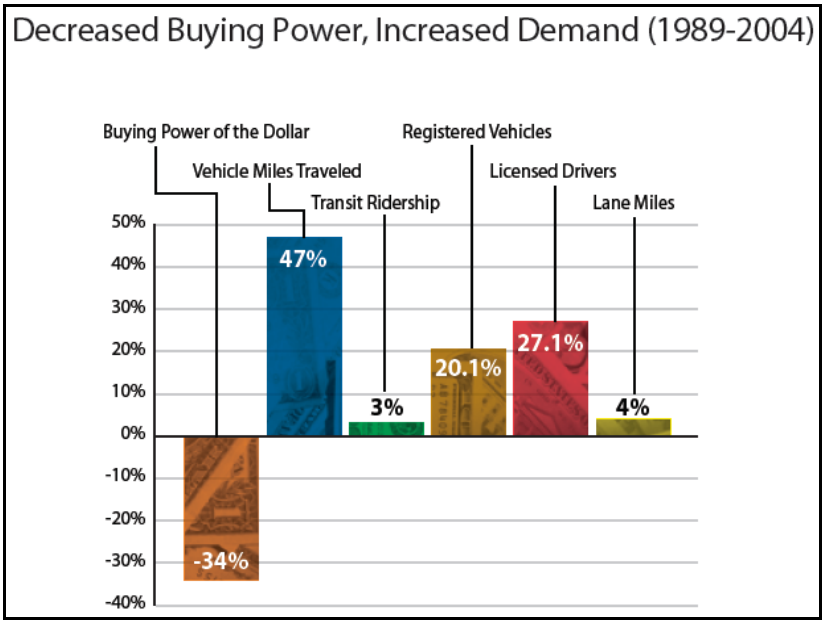
Guiding Principles It Serves: Ensure Financial Responsibility, Address Transportation from a Regional Perspective, Offer Meaningful Transportation Choices, Sustain and Enhance the Economy, Value Safety and Security

Existing Conditions
Tennessee, like many states, relies heavily on federal transportation funding. As a rule, the Tennessee Department of Transportation (TDOT) does not bond transportation projects; in other words, the approach to transportation projects is pay-as-you-go. While this helps the state

minimize debt, it also hampers Tennessee's ability to leverage adequate transportation infrastructure ahead of future development.

Federal and state gas taxes have traditionally funded the federal and state highway trust funds, yet with an aging infrastructure, these funds increasingly fall short of needs. Congress has not raised the federal gas tax, at 18.4 cents per gallon, since 1993. Tennessee's gas tax, 21.4 cents per gallon, has not increased since 1989 and is not indexed to inflation. From 1989 to 2004, the buying power of the dollar decreased 34 percent. In other words, every dollar TDOT now raises is worth only 66 cents in today's dollars. (Table 8).

Table 8: Tennessee's Transportation Funding Shortfall



Source: *TDOT Long Range Transportation Plan*, 2005.

Additional constraints on state transportation funding include:

- A statutory provision in Tennessee's state constitution that restricts gas tax revenues to road and highway projects only, versus making funding available for alternative transportation modes and projects. (T.C.A. Sec. 67-3-2001)[24]
- A gas tax distribution formula that gives a disproportionate amount of transportation funds to large, rural counties rather than metropolitan areas under the following formula:

    - **County formula** is based one-fourth on population, one-fourth on county area, and one-half on equal shares (ex., each of Tennessee's 95 counties receives 1/95 of all revenues).
    - **City formula** is based entirely on population. Motor fuel taxes are distributed according to the same formulas, while special petroleum product taxes are distributed to both cities and counties strictly on the basis of population."

Under this funding structure, Nashville/Davidson County acts as a "donor region" while the state's rural counties receive a portion of their funds regardless of population size.[25] Nationally, Tennessee is a "donor state."

While TDOT spends on average less than 10 percent of its budget on transit, their Long Range Transportation Plan proposes increasing state funding for transit by 45 percent by 2025.[26] By

[24] Robert Puentes and Ryan Price. *Fueling Transportation: A Primer on the Gas Tax*, Center on Urban and Metropolitan Policy, The Brookings Institution. http://www.brook.edu/es/urban/publications/gastax.pdf
[25] Tennessee Advisory Commission on Intergovernmental Relations (TACIR). *State Shared Taxes in Tennessee*, TACIR, March 2000.

committing a portion of revenues to transit, the state would increase its ability to meet federal matching requirements. Locally, Nashville/Davidson County spends up to 20 percent ($8 million) of its transportation operating funds on transit and has an average $10 million for capital projects (bricks-and-mortar projects) and $30 million for operations (traffic, safety and maintenance). [27]

Air Quality's Link to Transportation Funding

Automobiles are Middle Tennessee's largest source of ozone, a chemical more commonly known as smog. If a city's air pollution exceeds the Environmental Protection Agency's (EPA) ozone attainment standard, a smog guideline, the federal government can restrict highway funds for "non-attainment" of air quality standards.

"Non-attainment" is not a word any region wants to hear. From 1998 to March 1999, Atlanta lost $700 million of federal highway funding until it came up with a pollution abatement plan.[28][29] By offering travel options and diversifying projects receiving funding, these help the region avoid Atlanta's situation which hampered economic development.

Under an Early Action Compact (EAC), an agreement with the EPA to meet air quality standards, the Nashville Area Metropolitan Planning Organization (MPO) has until December 31, 2007 to demonstrate that the region's air quality meets the EPA standards.

Future Trends

Given the uncertainty of future federal and state funding, Nashville/Davidson County should anticipate the growing national trend of shifting transportation funding responsibilities to regional and local governments. This will continue unless gas taxes go up or other tools like tolls and bonds supplement existing revenue sources.

The federal Highway Trust Fund, which funds 45 percent of U.S. infrastructure and almost half of TDOT's budget, will fall $11 billion short of planned projects by 2009.[30] TDOT alone faces a potential $2 billion shortfall for planned projects by 2015, coupled with construction costs that are expected to increase by 70 percent. (Steel and concrete prices have risen as India and China's development puts especially large demands on a limited supply of materials).

Aside from material and labor costs, urban real estate poses considerable barriers to acquiring the right-of-way and widening roads. Widening a two-lane road to a four-lane section with a median lane for left turns now costs roughly $2 to $6 million per mile. Building or expanding one mile of urban interstate can cost up to $6 to $9 million per mile.[31] Overall, the return on highway

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[26] Tennessee Department of Transportation (TDOT). *Long Range Transportation Plan*, 2005, iii.
[27] ICF Consulting/Nashville MPO. *Regional Transportation Funding – A Strategic Review*, July 19, 2002, 25.
[28] Central Alabama Clean Cities, http://www.centralalcc.org/What_We_Do/what_we_do.html
[29] "Learning from Atlanta," Robert Wassmer and Robert Fountain, The Sacramento Bee, http://www.csus.edu/indiv/w/wassmerr/atlantanews.pdf
[30] American Association of State Highway and Transportation Officials (AASHTO). *Transportation, Invest in Our Future: Future Needs of the U.S. Transportation System*, February 2007.
[31] Washington State Department of Transportation (WSDOT). *Highway Costs: Are Washington State's Highway Costs in Line With National Experience?*, November 3, 2005. http://www.wsdot.wa.gov/accountablity/highwaycosts.pdf

investment, in terms of mobility, has steadily declined since the 1970s, since the most cost-effective roadway investments were made in the basic structure of the Interstate Highway System. [32]In other words, agencies spend the same or a greater amount of money to achieve diminishing returns on their investment.

Because of high construction costs, limited funding, and air quality concerns, Nashville/Davidson County should weigh the costs and benefits of differing transportation projects and their impacts by:

- Focusing road projects on maintenance and system efficiency improvements, with selective capacity-increasing projects like intersection projects and improved transit rather than large-scale road widening;
- Improving the surface street network to serve all modes through street connectivity and creating lanes for multiple modes, depending on abutting land use;
- Understanding the costs and benefits of providing improved transit in terms of service hours, frequency and service area.
- Expanding public/private partnerships in the development process
- Creating more stable, local financing for future transportation maintenance/expansion

Safety

Why It Matters: The transportation system needs to be able to handle events from daily accidents to natural disasters. A safer transportation system, notably the county's major streets, can foster the use of alternative transportation modes.

Guiding Principles It Serves: Offer Meaningful Transportation Choices, Sustain and Enhance the Economy, Value Safety and Security

Existing Conditions
Nashville/Davidson County's transportation system could be made safer by a simple act: drivers slowing down. Traffic fatality statistics show (Table 9) an average of 93 people were killed every year in traffic accidents from 2001 to 2005, with 25 percent of all fatalities being speed-related. Also, 15 percent of the county's fatalities were pedestrians. In both cases, whether you are a driver or pedestrian, increased speed decreases your chances of surviving a crash.

[32] Congressional Budget Office. *Economic Effects of Federal Spending on Infrastructure and Other Investments,* 1998.

Table 9: Traffic Fatalities, Davidson County, Tennessee, 2001-2005[33]

Trend of Fatalities, 2001-2005

		2001	2002	2003	2004	2005
Fatality Counts	Total Fatalities	106	80	91	99	91
	Alcohol-Related	56	36	30	40	34
	Single Vehicle	52	46	42	57	47
	Non-Junction	74	56	67	81	61
	Intersection	16	12	12	9	20
	Intersection-Related	2	4	2	4	2
	Speeding Involved	26	18	22	32	21
	Pedestrians	15	9	15	12	10
	Pedalcyclists	1	0	0	0	5
	Large Truck Involved	8	4	10	21	20
	Roadway Departure	56	52	43	54	41
	Passenger Car Occupants	57	42	47	47	38
	Light Truck/Van Occupants	26	22	22	31	23
	Other/Unknown Occpants (not including Motorcycles)	1	1	1	2	5
	Total Occupants (not including Motorcycles)	84	65	70	80	66
	Motorcycle Riders	6	5	6	7	8

Future Trends

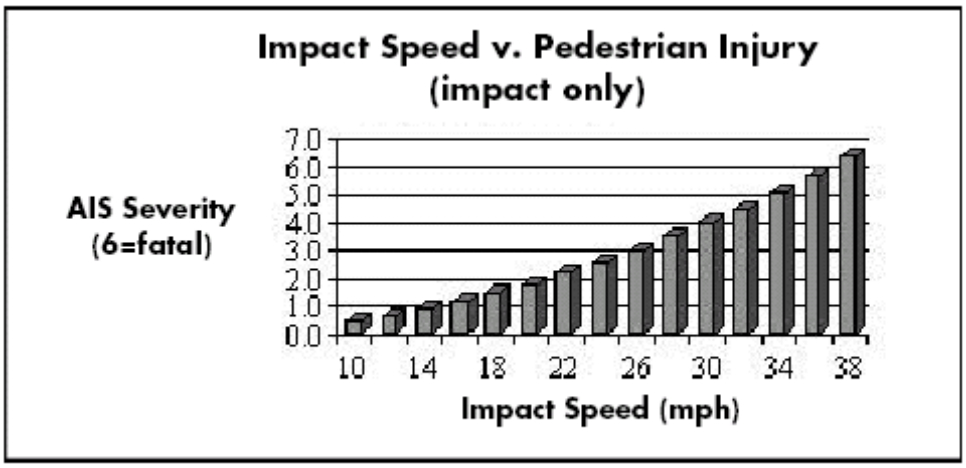
In order to maximize the safety of pedestrians and drivers, speed should be managed first through community design (street width, building setbacks, street trees, etc.) and second through law enforcement. Statistics reveal that many factors (vehicle safety, alcohol, etc.) contribute to fatalities, and like them, speed is something that can be addressed on a community-wide scale and whose management can have multiple benefits.

In automobile/pedestrian accidents, the likelihood of fatal pedestrian injury is 3.5 percent at 15 miles per hour, 37 percent at 31 miles per hour and 83 percent at 44 miles per hour.[34]

[33] National Highway Traffic Safety Administration. http://www-nrd.nhsta.dot.gov/department/nrd-30/ncsa/STSI/47_TN/2005/Counties/Tennessee_Davidson%20County_2005.HTM

[34] Limpert, Rudolph, *Motor Vehicle Accident Reconstruction and Cause Analysis.* Fourth Edition. Charlottesville, Virginia, The Michie Company, 1994, p. 663

Table 10: Likelihood of Pedestrian Dying When Hit by a Car



Pedestrian injury indexes for speeds 10 to 38 mph (AIS = abbreviated injury scale)

Source: Limpert, Rudolph, Motor Vehicle Accident reconstruction and Cause Analysis. Fourth Edition. Charlottesville, Virginia, The Michie Company, 1994, p. 663

Pedestrian injury and fatality rates increase with speed because drivers need longer distances to break and stop, also known as perception-reaction time. An increase of only ten miles (from 20 to 30 miles per hour) requires 2.5 times the braking distance to stop (33 to 86 feet), or 5 times the braking distance at 40 miles per hour.

Higher vehicle speeds also limit a driver's peripheral vision. At lower speeds, a driver can comfortably see and notice pedestrians along sidewalks and in crosswalks. Once speeds exceed 40 miles per hour, a driver's field of vision is focused almost exclusively on distances that are far away (more like driving on an Interstate highway) rather than distances that are close by (more like driving on surface streets).

GUIDING PRINCIPLES AND PROPOSED STRATEGIES

An efficient transportation system is crucial to Nashville-Davidson County's long-term economic, social and environmental sustainability. Because growth and development decisions have long-lasting impacts, guiding principles are useful for private (developers, property owners, residents) and public (elected officials and government agencies) stakeholders in linking land use and transportation choices. These principles help achieve the diversity of development and transportation choices sought by the community.

In consideration of past plans and current best practices, the following guiding principles will be used to judge transportation improvements. Although each guiding principle lists proposed strategies for their success, stakeholders are encouraged to offer additional strategies if they demonstrate how their development proposals meet the guiding principles.

1. Create Efficient Community Form

Strategically linking land-use decisions and transportation investments to create meaningful transportation options should be a priority in all sub-division and zoning decisions. Strategies that serve businesses, residents and visitors include:

1. Encouraging and prioritizing development that provides density and mixed-use in appropriate locations.
2. Locating development to capitalize upon existing transportation options and prioritizing transportation investments to serve future development.
3. Creating or improving street connectivity and capacity at the neighborhood and regional level
4. Creating and adjusting street cross sections to compliment their land use context
5. Updating and enforcing zoning and sub-division regulations regarding parking, access management, lot orientation and block size. Current regulations that support sustainable development include:
    a. **Urban Zoning Overlay (UZO)** – allows flexibility with setback, parking requirements in older sections of Nashville (generally, former City of Nashville city limits)
    b. **Specific Plan (SP)** – zoning that focuses more on layout/design than use
    c. **Adaptive Residential Development (ARD)** – zoning that allows residential redevelopment of underutilized commercial and industrial land along major streets with the UZO
    d. **Walkable Subdivision Standards** – encourages connected streets, human-scale blocks (less than 600 feet long), buildings fronting to the street

2. Offer Meaningful Transportation Choices

Changeable energy prices and sources, concerns about the environmental impacts of transportation choices and changing demographics highlight the need for a truly multi-modal transportation system. The continued viability of Nashville depends on providing adequate mobility to provide for the needs of residents, businesses and visitors. Strategies include:

1. Reducing trip lengths and providing multiple routes through more direct street/route connectivity.
    a. Encouraging network connectivity (street, sidewalk, greenway, transit, bike/pedestrian, freight) when possible in new and infill development:
        i. Eg. Path easements from cul-de-sacs leading to the next street to ensure shorter, more direct routes between destinations
    b. Amending the zoning code to encourage mixed-use development that provides services in closer proximity to other uses, namely housing
        i. Eg. Create a transit overlay district that allows higher densities, reduced parking requirements, more flexible floor-area-ratios (FAR), etc.

2. Enabling bicycling and walking to be reasonable alternatives to single occupant vehicles for short or non time-sensitive trips.

3. Enabling effective transit by making vehicles and their supporting infrastructure
    a. **Efficient** (this may take the form of dedicated lanes on major streets/highways, signal priority for transit vehicles, and selective routing choices based, in part, on land use/urban design patterns)
    b. **Comfortable** (shelters, lighting, clearly-marked route signs/timetables, easy and timely transfers)
    c. **Reliable** (adequately spaced stops, dedicated lanes, "Transit Tracker" phone hotlines and electronic display boards)

4. Expanding the transportation system's capacity to serve a variety of needs, including low-income households, children, seniors and people with disabilities

3. Sustain and Enhance the Economy

Every element of Nashville's economy relies on transportation, therefore, decisions on transportation improvements should be judged on their ability to efficiently move people and goods. Strategies include:

Moving People

1. Creating and maintaining a well-connected, distributive surface street network for multiple modes. This includes developing and redeveloping arterial streets through access management, especially for trips of 5 miles or less, since investments in arterial projects can cost one-tenth to one-fifth the cost of highway improvements.[35]
2. Managing congestion as a situational issue (ex. time of day, weather, accidents, work/school zones) in addition to a capacity issue (ex. road widening, interchange construction).
3. Placing high priority on services, incentives and infrastructure that provide alternatives to driving alone.

[35] Cumberland Region Tomorrow, *A Report to the Region*, 2003, 18.

Moving Goods

1. Designating freight-only lanes on Interstate highways and major freight corridors.
2. Encouraging flexible delivery schedules and maintaining reliable travel times.
3. Expand network (street, sidewalk, transit, etc.) capacity where managing congestion is not adequate to provide desired mobility

4. Value Safety and Security

Decisions about Nashville/Davidson County's transportation system should maintain and improve safety and security. This is not only important for residents and visitors, but also for the community's economic strength. Strategies include:

1. Reducing traffic fatality and injury rates by placing a high priority on public and private investments that address safety, including speed management, intersection safety and highly-visible signage/pavement markings for all modes.
2. Using Metro Public Works' existing traffic calming program (ex. enforcement, physical design changes, visual changes) where necessary to address existing conditions, in to designing:
    a. Neighborhood-scale development that self-regulates speeds at 30 mph on local streets
    b. Regional-scale development that self-regulates speeds at 40 mph on collector and arterial surface streets
3. Increasing the transportation system's resilience to events ranging from common events (ex. stalled vehicles, accidents) to extraordinary events (ex. natural disasters, utility failures) through network connectivity and redundancy (ex. multiple bridges crossing the Cumberland River, better connected surface streets)

5. Protect Human Health and the Environment

Transportation improvements should be made in a manner that enhances personal health by providing opportunities for active living as well as overall environmental quality. Strategies include:

1. Avoiding or minimizing impacts to ecological systems when undertaking transportation improvements.
2. Improving air quality via actions that reduce or prevent emissions such as using alternate travel modes for short trips, trip-chaining (combining errands), reducing trip distances and synchronizing traffic signals.
3. Improving water quality via actions that reduces or prevents stormwater run-off such as pervious paving materials and rainwater gardens.
4. Improving opportunities for Active Living (walking, bicycling, general physical activity) and overall community health.

6. Ensure Financial Responsibility

Transportation improvements should be weighed for their ability to leverage investment to achieve long-term community objectives such as closer proximity of uses, strategically-located development and economic development/revitalization. Development, whether undertaken by

government agencies or private developers, should meet the guiding principles described above. Strategies include:

1. Reusing and re-allocating right-of-way to provide:
    a. Reduced transit travel times
    b. Sidewalks, bike lanes, landscaping, or on-street parking
    c. Adequate maintenance of existing infrastructure (street and sidewalk paving, bridge stability, water and sewer line durability) before creating new infrastructure, i.e. "Fix it first."
2. Seeking more stable and innovative funding for future multi-modal transportation projects (e.g. dedicated funding).
3. Encouraging development and transportation projects to reflect their *full* development cost including, for example, the cost of parking or additional capacity demands, long-term maintenance, short-term vs. long-term costs.

7. Address Transportation from a Regional Perspective

The economic success of Nashville/Davidson County and its neighboring communities are linked through jobs, housing and environmental quality (air/watersheds). At the same time, communities compete for tax structures, jobs and housing. Strategies include:

1. Considering the regional impacts of transportation and land use decisions.
2. Working closely with the Nashville Area Metropolitan Planning Organization (MPO) on transportation planning.
3. Working closely with Cumberland Region Tomorrow (CRT) on land use planning.
4. Considering models from other regions.
5. Considering regional funding for transportation.
6. Involving transit agencies in the development review process.

MOVING FROM PRINCIPLES TO ACTIONS

Upon the adoption of the Guiding Principles described in this document, work will begin on updating the *Major and Collector Street Plan* and creating a *Transportation Policy* document that outlines recommended policy changes (to zoning code, subdivision regulations and Metro Government policy) to improve mobility in Nashville/Davidson County. Both the update of the *Major and Collector Street Plan* and the creation of a Transportation Policy document will be informed by these Guiding Principles.

The following section previews a range of policy strategies Nashville/Davidson County could choose from to improve and maintain its transportation system. In order to approach transportation and land use planning in a comprehensive way, three main perspectives needed are:

1. **Land Use Management** – Ensuring efficient growth and development from the site level to the county level.
2. **Transportation Supply Management** – Expanding street/highway, sidewalk, bicycle, transit and freight network where workable.

3. **Transportation Demand Management** – Approaching the transportation system from a "work smarter, not harder" approach where additional capacity is not workable.

Land Use

Past transportation plans have contained more uniform transportation standards that were applied Metro-wide without regard to the diverse environmental and developed character of Davidson County, ex., without regard to the Community Transect. Because there are many development patterns across Metro needing mobility, and because the community has noted, through community planning, that it values a diversity of development patterns, it is important to have transportation policies that respond to a variety of physical settings. This includes the need for additional modes and the features they require like medians, transit shelters and landscaping.

Many transportation plans consider transportation improvements from two traditional perspectives – the supply management perspective (ex. widening roads) and the demand management perspective (ex. carpooling). This Transportation Plan includes those perspectives, but also places a heavy emphasis on linking land use and transportation planning.

As such, this Transportation Plan recognizes that transportation options *must* address the diversity of development throughout Metro Nashville/Davidson County ranging from the urban core of Downtown Nashville to rural areas such as Parkwood and Union Hill. In order to illustrate and guide Metro's diversity of development and density patterns, the Metro Planning Department uses a tool called the Community Transect.

The Community Transect is a tool used to recognize and provide for a continuum of development patterns ranging from rural to urban. The Community Transect values a diversity of development patterns and asks that, within each transect, that the built environment be consistent with the intensity of development intended for that area. There are seven transects:

1. Natural Areas. Publicly and privately owned land intended to be permanently maintained as open space due to environmental constraints.

2. Rural Areas. Very low intensity development; farms and forests.

3. Suburban Areas. Primarily low density, single-family residential uses with some neighborhood commercial and civic uses.

4. Neighborhood Areas. Low to medium density housing, with a variety of housing types, and compatibly-scaled commercial and civic uses located in neighborhood centers or commercial corridors along the neighborhood edge, within walking distance of homes.

5. Centers. A more concentrated mix of land uses, with higher intensity residential and commercial areas that serve multiple surrounding neighborhoods.

6. Core. A highly urbanized mixture of land uses that includes the Downtown.

7. Districts. A range of generally single use areas including medical centers, universities, industrial parks, and airports that may vary in development form from suburban to neighborhood to center.

As noted above, the Community Transect asks that, within each transect, the built environment be consistent with the intensity envisioned for that transect. Consider, for example, a street and sidewalk in various transects. In the Core, a street will have curb and gutter, with trees in tree wells and wide sidewalks for pedestrians, street cafes, etc. In a neighborhood, the street will have curb and gutter, but also a planting strip of grass and trees and a narrower sidewalk. Meanwhile, in a rural area, the street will have soft shoulders and swales and if a sidewalk is provided, it will look like a walking path.

Metro's Community Planning process and policy plans such as the *Strategic Plan for Sidewalks and Bikeways*, use the Community Transect as a core organizing principle. The Transportation Plan update utilizes the Community Transect to provide consistency and honor the community's call for preserving the diversity of development by creating standards that vary by context.

Areas of Change and Areas of Stability
In addition to using the transect to recognize Nashville/Davidson County's diversity of development, linking land use and transportation also calls for distinguishing areas of stability and areas of change. Doing this creates more predictability on the degree of development or redevelopment that both the development community and general public can expect in a given area.

Currently, the document formerly known as the *Land Use Policy Application*, which includes all of the land use policies that guide zone changes, is being updated. Its new name is the *Community Character Manual*, indicating an emphasis on community character or form over merely use and density. The Community Character Manual speaks to areas of stability and areas of change. The community character policies for areas of stability are generally labeled neighborhood *maintenance* policies, while the areas of change are generally labeled neighborhood *evolving*. .

With the exception of Bellevue and southeastern Davidson County, much of Metro's future growth and development will occur within its existing developed areas. This can be done in a selective manner that preserves the best of our existing neighborhoods while innovating and improving on sites and corridors that are more appropriate for change. This is often called a Hard/Soft analysis, where you look at things that are least likely or least appropriate to change (ex. oldest church in the city) ranging to things that are available for re-use (ex. large parking lots).

While the terminology used in the *Community Character Manual* and this document varies, the idea is generally the same. **Areas of Stability** or Maintenance policies are primarily residential neighborhoods. In contrast, **Areas of Change** or Evolving policies are likely to develop on greenfield, (undeveloped pieces of land), but are also suitable for infill or redevelopment of older sections of Nashville/Davidson County. For example, as of 2001, an estimated 20 percent of the country's malls and big-box retailers (ex. Wal-Mart, K-Mart) were in a state of decline, in addition to "ghostboxes" (former big-box stores)[36] This phenomenon has led to the term greyfield, which refers to abandoned/empty shopping centers that have redevelopment potential.

Change through new growth and development can be positive, and for Nashville/Davidson County to be a desirable place to live, change is necessary over time. Taking this approach to land use differentiates two categories, which both have their own sets of challenges and opportunities:

Density
This plan makes a distinction on density. Higher density always reduces land consumption, but it only has transportation benefits when paired with different types of development (housing, office, retail, etc.) that provides destinations within:

1. Convenient walking distance of transit and/or mixed-uses (1/4 mile or less)

[36] Pricewaterhouse Coopers, *Greyfield Regional Mall Study*, February 2001. Greyfields were defined as "centers where average sales/sq. ft. had dropped to less than $150, or one-third the rate of successful malls." The fate of many 350,000 sq. ft. + malls are being tracked at www.deadmalls.com.

2. Areas that have access to transit and transportation corridors
3. Areas that have street patterns that are interconnected and developed with sidewalks.

Transportation Supply Management

Adding transportation capacity, or supply, has been our most common response to transportation problems for many years. When this takes the form of large-scale road widening, there are trade-offs to consider

Table 11: Trade-offs of Road Widening

	Trade-offs	
Road Widening	Creates more space that can include bike and transit lanes.	Increases pedestrian crossing distances.
	Creates a setting for taller buildings (building height to street width ratio)	Can demolish and displace adjacent homes and businesses.
	Can lessen accidents if turn-lanes are provided.	Increases driver tendency to speed.
	Keeps traffic moving, maintaining better air quality.	Increases impervious surfaces, which increase stormwater run-off (flooding/pollution)
	Can increase commercial property values.	Can create more opportunities for accidents with traffic weaving/passing on left and right of slower vehicles.
	Cost-effective when done with utility/transit/corridor-scale redevelopment	Costly & may divert existing traffic from other streets

Given the trade-offs, there are other options that Metro considers in light of increasingly constrained right-of-way and fiscal conditions.

A variety of travel modes and operational improvements are recommended for the network, as no single mode or technology can serve all the particular land use and mobility needs of the area. The following options should be considered before large-scale road widening:

Transit: Creating Options and Flexibility

Transit is effective when it is efficient, comfortable, reliable, safe and competitively priced. The term "transit," as opposed to "public transportation" or "mass transit," more accurately reflects the range of Metro-provided and private/smaller-scale transit services.

Although light rail and commuter rail lines are often discussed in regard to transit, they are most effective when they are supported by buses, which form the backbone of a true transit network and are a more financially realistic option for Nashville/Davidson County. The following are goals for transit:

Goals

1. *Focus on moving people and goods, not vehicles*. This requires a long-term shift from Single Occupant Vehicles (SOVs) to SOVs *and* multiple other modes in the same space through enhancements (ex. dedicated transit lines, traffic signal prioritization for transit vehicles, bus shelters).

2. *Locate transit on corridors where there is higher density to support it.* This requires supportive land-use and urban design patterns to most effectively leverage transit investments.

3. *Make transit more cost-beneficial.* Transit generally demonstrates a COST-benefit rather than TIME-benefit, and to a lesser extent, it can perhaps be sold for its CONVENIENCE-benefit (re: ability to read newspaper, catch up on work, etc. vs. driving which demands attention and can be stressful).

4. *Minimize transfer and waiting times*. These are often perceived to be more inconvenient than in-vehicle time.

5. *Maximize transit visibility and comfort.* Clearly marked, consistent signage (like a brand-name logo) and stations make transit easier to use.

Local Bus

Figure 11: MTA Buses, Deaderick St., Nashville

Buses moving in traffic, characterized by:

1. Highly-visible, clean shelters, with posted route maps, timetables and electronic arrival time displays when possible
2. Stops located 1,000 to 2,000 feet apart, or 4 to 6 stops per mile in urban areas.[37]
3. Adaptability to a range of street sizes
4. Frequent peak service of 15 minutes or less
5. Signal jump (ex. buses get first priority at traffic lights)

Suitable for:
Density: Minimum 7 du/acre, average 10 du/acre[38]
Transect: District, Core, Center, Neighborhood, Suburban

[37] Bus Stop Location. http://en.wikipedia.org/wiki/Bus_stop
[38] Source: Oregon Department of Transportation, Transportation Growth Management program, http://darkwing.uoregon.edu/~cpw/projects/pdf/featured/tgm_2003/educational%20materials/Transit%20Oriented%20Development_Brief.pdf

Bus Rapid Transit (BRT)

Figure 12: Bus Rapid Transit, MTA Silver Line, Los Angeles

Single and articulated buses (buses linked together like train cars) characterized by:

1. Exclusive right-of-way or mixed-traffic lanes
2. Stations located 1 mile or more apart from each other
3. Pre-paid fares, lessening passenger wait-times
4. Less frequent stops than local buses, allowing quicker long-distance travel

Suitable for:
Density: Minimum 10-12 du/acre[39]
Transect: District, Core, Center

[39] Charlotte, NC Zoning Code, Transit Supportive Overlay District. 12 du/acre for adopted Station Area Plan, 10 du/acre without adopted Station Area Plan. Source: http://ww.charmeck.org/Planning/Rezoning/TOD-TS-PED/ZoningOrd_TS.pdf

Streetcar

Figure 13: Streetcar, Portland, Oregon

Single and multi-car trams (on fixed-rail, yet smaller/lighter than light-rail cars) characterized by:

1. Right-of-way within that of major streets
2. Can fit well on smaller-scale streets, particularly on one-way street pairs (ex. 2nd and 4th Ave.)
3. Frequent peak service of 15 minutes or less
4. Smaller service areas (ex. Downtown, districts)
5. Set stations 1 mile or less apart from each other
6. Existing heavy use of bus service, which streetcars may replace in consideration of long-term fuel and maintenance costs for buses versus more durable streetcar vehicles
7. Require overhead power lines

Suitable for:
Density: Minimum 10-12 du/acre[40]
Transect: District, Core, Center, Neighborhood

[40] Charlotte, NC Zoning Code, Transit Supportive Overlay District. 12 du/acre for adopted Station Area Plan, 10 du/acre without adopted Station Area Plan. Source: http://ww.charmeck.org/Planning/Rezoning/TOD-TS-PED/ZoningOrd_TS.pdf

Light Rail Transit (LRT)

Figure 14: Airport Light Rail, Portland, Oregon

Single and multi-car trains characterized by:

1. Right-of-way within that of major streets and highways
2. Stations located 1 mile or more apart from each other

Suitable for:
Density: Minimum 10-12 du/acre[41], 40 du/acre average to 20 du/acre minimum[42]
Transect: District, Core, Center

[41] Charlotte, NC Zoning Code, Transit Supportive Overlay District. 12 du/acre for adopted Station Area Plan, 10 du/acre without adopted Station Area Plan. Source: http://ww.charmeck.org/Planning/Rezoning/TOD-TS-PED/ZoningOrd_TS.pdf

[42] Bay Area Proposed Density Requirements, for LRT/DMU within ½ mile of station
Source: http://www.transcoalition.org/c/sus_rtp/rtp_landuse_policy.html

Commuter Rail

Figure 15: Music City Star commuter rail, Nashville

Multi-car trains enhanced/characterized by:

1. Highly concentrated employment centers (re: CRT, 2001)
2. Exclusive right-of-way
3. Infrequent stops, allowing quicker long-distance travel
4. Use of existing freight railroad lines when schedules permit
5. Stations located at 3 to 5 mile intervals
6. Flexibility of land-use at stations
   Ex. Surface parking can be a form of "land-banking", since local governments often own the land and can leverage it into transit-oriented development[43]

Suitable for:
Density: Minimum 12 du/acre, average 18 du/acre[44], 25 du/acre minimum to 45 du/acre average[45]
Transect: District, Core, Center

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[43] Coping with Complexity in America's Urban Transport Sector
Robert Cervero, Professor
Department of City and Regional Planning
University of California, Berkeley
Paper prepared for the 2nd International Conference on the
Future of Urban Transport, Göteborg, Sweden, September 22-24, 2003

[44] Bay Area Proposed Density Requirements, for Regional Rail/Ferry within ½ mile of station
Source: http://www.transcoalition.org/c/sus_rtp/rtp_landuse_policy.html

[45] Bay Area Proposed Density Requirements, for Regional Rail/Ferry within ½ mile of station
Source: http://www.transcoalition.org/c/sus_rtp/rtp_landuse_policy.html

Ferries/Water Taxis

Figure 16: River ferry catamaran, Sydney, Australia

Fleets of varying boat sizes enhanced/characterized by:

1. Exclusive right-of-way on the Cumberland River
2. Distances may be longer, given the river's meandering nature, yet travel times could be competitive if land routes like Gallatin Rd., I-65, Ellington Pkwy. and Briley Pkwy. are regularly congested
   (While the General Jackson riverboat provides a slow, tourist-oriented travel mode between downtown and the Opryland Area, future mixed-use redevelopment in these two major activity centers could warrant high-speed catamarans serving commuters between the two areas.)
3. High speeds can require riverbank enhancements to prevent erosion due to wakes.

Suitable for:
Density: Minimum 12 du/acre, average 18 du/acre[46] or 25 du/acre minimum to 45 du/acre average[47]
Transect: District, Core, Center

[46] Ibid.
[47] Bay Area Proposed Density Requirements, for Regional Rail/Ferry within ½ mile of station
Source: http://www.transcoalition.org/c/sus_rtp/rtp_landuse_policy.html

Pedestrian System: Walking Connects All Trips

Like a road extension or widening, sidewalk and greenway construction is a supply strategy. Walking is the most basic form of transportation and is effective when an environment supports a mix of uses in close proximity to each other. Ever for auto and transit-based trips, drivers and passengers ultimately have to walk through a parking lot or from a transit stop to reach their destination, so a safe and welcoming pedestrian environment should be sought across Nashville/Davidson County's range of development patterns.

Sidewalks

Figure 17: Sidewalk, Belmont Blvd., Nashville (left), Sidewalk with transit amenities, Albion St., Nashville (right)

Varying widths are characterized by:

1. Accommodating passing pedestrian traffic
2. Accommodating outdoor dining and streetscape amenities in more urban districts
3. Providing safe passage over bridges

Suitable for:

Density: Applicable in:

1. Neighborhood to urban environments where destinations are in close proximity to one another.
2. Areas needing a safe pedestrian link between activity centers (ex. school zones, sporting and concert venues)

Transect: District, Core, Center, Neighborhood, Suburban

Pathways

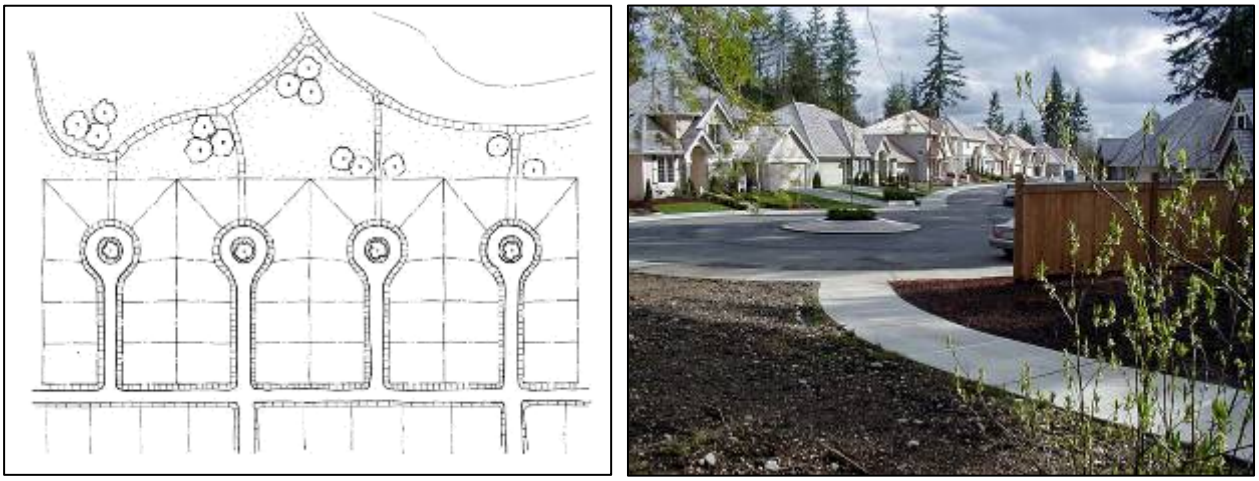


Figure 18: Pedestrian connections, Metro Nashville Subdivision Regulations, (left), Cul-de-sac connection, Tukwila, Washington (right)

Varying routes enhanced/characterized by:

1. Stairways for linking adjacent buildings/streets in hilly areas
2. Alleys/lanes for connecting adjacent building, streets and particularly, cul-de-sacs/dead-end streets

Pedestrian bridges

Figure 19: Pedestrian bridge on Shelby Bottoms Greenway (Source: Craig Owensby)

Bridges built separately or adjacent to motorized-traffic bridges enhanced/characterized by:

1. Safely carrying bicyclists and pedestrians over high-traffic corridors
2. Stream crossings and steep ravines where at-grade sidewalks are infeasible

Suitable for:
Density: All densities provided adequate right-of-way/easement and property access is secured.
Transect: All land uses.

Traffic Calming

While sidewalks and greenways give pedestrians a safe travel space, traffic calming is a transportation supply measure that improves safety for both pedestrians and drivers.

Figure 20: Traffic circle, River Rd. , Nashville (left), Lane re-striping, Fairfax Ave., Nashville (right)

Physical and visual modifications to streets and intersections that help control traffic speeds and volumes enhanced/characterized by:

1. **Physical Design Changes**
    - **a.** Physical design changes tend to be costlier up-front, yet ultimately self-enforcing and cost-effective in the long-run
    - **b.** Allowing quicker, safer lateral pedestrian and bicycle movement (ex. crossing streets vs. linear mobility, walking down a street)
    - **c.** These measures are commonly known as *vertical deflection* (speed humps, etc.) and *horizontal deflection* (bulb-outs, etc.)

Table 12: Speed humps (left), Bulb-out (right)

2. **Visual Design Changes**
    - **a.** Narrowed striping/re-striping, highly-visible "Zebra-Stripe" crosswalks and "Pelican" striping to alert drivers of upcoming pedestrian zones
    - **b.** Street trees and landscaped buffers to influence driver comfort in relation to speed and sight distance, since a driver's "field of vision" widens at slower speeds. This decreases the likelihood of crashes and lessens the intensity of crashes (ex. fender-bender vs. fatal collision)

Density: All densities, pending Metro Public Works' approval.
LUPA Land Use: All land uses.

Bicycle System: Filling the Gap Between Walking and Driving

While sidewalks and greenways give pedestrians a safe travel space, bicycle facilities are a transportation supply measure that provides bicyclists with safe travel routes.

Bicycling extends into the trip range of 1 to 3 miles, making it faster than walking and at times, comparable to car and transit travel in consideration of finding parking or walking from a transit stop. As such, safe and accommodating environments for bicycle recreation and commuting should be sought across Nashville/Davidson County's range of development patterns.

Bike Lanes

Table 13: Demonbreun St. viaduct bike lane, Nashville

On-street lanes characterized by:

1. Streets with controlled access from adjacent driveways
2. Streets with adequate right-of-way to allow 4 foot minimum lanes on either side of it
3. Arterial and collector streets (or local streets paralleling them) that provide the most direct routes between destinations

Bike Pavement Markings

Table 14: Bike pavement marking

On-street pavement markings characterized by:

1. Constrained right-of-way
2. Official pavement markings, which help legitimize bicycle traffic for all road users

Wide Shoulders

Table 15: Wide shoulder on rural road, (Dan Burden)

On-street roadway sections characterized by:

1. Minimum two foot paved shoulders, which benefit the safety of all modes
2. Rural and suburban roads

Greenways

Table 16: Shelby Bottoms Greenway, Nashville

Off-road paths characterized by:

1. Closely paralleling road or rail corridors, which give them a recreation *and* transportation function as long as they transition safely to on-street facilities
2. Ability to link otherwise disconnected streets or buildings (ex. cul-se-sac connections or district environments with large blocks)
3. Ability to link parks with other recreational sites.

Transportation Demand Management

Transportation demand management (TDM) approaches the transportation system from a "work smarter, not harder" approach, using elements ranging from subsidized transit passes to customized parking rates to address travel demand. TDM programs can be implemented through a combination of government ordinances and private sector decisions. In order for TDM to be effective, it needs to be applied Metro-wide, but particularly in activity centers such as the airport, downtown and university campuses.

Communities and the individual businesses should view transportation as a key tool in recruiting and retaining new businesses and the employees that sustain them. An efficient and flexible transportation system ultimately relies on a multitude of options, such as bicycling, transit and variable parking payment options, rather than a "big fix" of new or expanded roadways. As such, the business community has great potential to influence transportation decisions and will best serve itself and the community by seeking regional travel options. TDM strategies can include:

Employer Benefits: More Than Health Insurance and Vacation Days

For businesses ranging from large corporations to neighborhood businesses, transportation and congestion affect their bottom line. Employees, customers and freight suppliers all need to get around, so providing and encouraging travel options can benefit businesses in several ways including:

- Tax benefits
- Less stress for employees
- Cleaner air
- Continued highway funding for economic development

When employers promote travel choices, they set their business apart from the competition. Transportation benefits help recruit employees and provide benefits to employees who often value transportation nearly as much as health and child care. In fact, transportation is now often the second biggest expense after housing.[48] Just as people value having housing choices among houses, apartments, condos, townhomes, and lofts, people need and value a range of travel options.

Transportation Management Associations (TMA)

Transportation Management Associations, or TMAs, are nonprofit coalitions of local businesses and/or public agencies that work to strengthen partnerships with businesses to reduce traffic congestion and pollution by improving commuting options for their employees.

Examples of Business Programs

Nike

Nike, a shoe and athletic wear company, has its headquarter in Beaverton, Oregon, a suburb of Portland. The company's Traveling Responsibly - Accepting the Challenge (TRAC) program began in 1992 with a 98 percent drive-alone rate. By 1997, that rate dropped to 87 percent and further to 76 percent by 2003 thanks in part due to the regional transit authority's transit pass program and a Nike shuttle service between the nearby Beaverton Creek MAX light rail station and Nike's Beaverton campus. The company also hosts an internal TRAC web site where employees can check out an in-house carpool match list, transit schedules, traffic updates and maps of safe bike routes.

CH2M Hill

This engineering and planning firm has offices across the country, including one in Bellevue, Washington, a Seattle suburb. The company offers employees $40 a month if they commute without driving alone and free parking if they drive alone. As of 2002, the firm's 310 commuters drive-alone rate dropped from 89% to 35%, 44% of employees rode the bus from home or from area transit Park & Rides, 11% of employees carpooled, 3% vanpooled, 2%

[48] "Driven to Spend: Pumping Dollars Out of Our Households and Communities," STPP (www.transact.org), June 2005.

walked, 1% telecommuted, and 1% biked. CH2M HILL's parking management program saves the company almost $73,000 every year.[49]

The Walt Disney Company
Disney's Commuter Transportation program subsidizes transit passes for employees, supporting the expansion and development of public transit throughout Southern California. Successful results of the program include:

- Reducing parking lots and garage demand through carpooling and transit to save over $2 million every year
- Saving over $200,000 that would have gone to outside consultants to provide commuting data in development planning
- Providing a backup plan for emergency situations (prevented a loss of millions in productivity after the 1994 Northridge earthquake)..[50]

Georgia-Pacific
Since 1997, the paper and lumber product company's Distribution Division headquarters in suburban Atlanta reduced parking demand by 130 spaces and saved a $100,000 surface parking lot expansion through employee van vanpool subsidies and actively promoting carpooling. In 2003, the company's Clean Air Campaign also saw transit ridership and the number of carpools among its downtown Atlanta employees increase by 10 and 55 percent respectively.[51]

Tax Benefits

Employer-paid benefit option

Over employers can offer reduced cost transit passes as benefits, just like health insurance and child care. Compared to an annual cash salary increase, employers offering annual transit passes avoid the costs of FICA (Social Security) and reduce their state and federal tax bills. Many transit agency's bus pass programs allows companies to provide transit passes based on a cost relating to current ridership and transit pass revenue at the worksite.

Employee-paid pre-tax benefit option

If a company cannot cover the costs of the transit pass benefit, one option is to set up a payroll deduction program and allow employees to exchange part of their gross income for transit passes. Employees save on federal and state income taxes since their pre-tax payroll deduction is no longer reported as taxable income.

[49] Commute Trip Reduction Challenge, http://www.commuterchallenge.org/cc/daw00ch2m.html
[50] Phil L. **Winters** and Sara J. Hendricks, *Quantifying The Business Benefits of TDM*, Center for Urban Transportation Research, for the Office of Research and Special Programs, USDOT (www.nctr.usf.edu/html/416-11.htm), 2003. 13-14
[51] Central Atlanta Progress, http://www.centralatlantaprogress.org/NewsGPPACE.asp, 2003.

Fair share benefit option

A third option is for employers and employees to share the costs. An employer could subsidize part of a transit pass and allow employees to pay the balance using pre-tax income. The employer then purchases the passes using contributions from employee salaries and their employer funds, and then distributes passes to the employees.[52]

Low-stress employees, high-production workplaces

Many employees consider their commute an extension of the workday and a stressful driving commute seriously impacts an employee's job satisfaction, negatively affecting employee retention. Employees arriving to work late, or stressed from the long commute negatively impact overall productivity. In addition to boosting an office's morale, studies have shown that employers that providing an excellent package of commuter benefits will reduce the number of drive alone commuters by 150-300 per every 1,000 employees.

Health problems

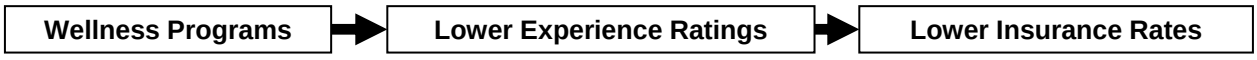
Rather than driving alone, employees may walk or bike, two ways to curb "lifestyle illnesses" such as Type II diabetes and high blood pressure related to obesity. Obesity is associated with 39 million lost workdays[53] and the total cost of obesity to U.S. companies is estimated at $13 billion per year, including:[54]

- health insurance $8 billion
- paid sick leave $2.4 billion
- life insurance $1.8 billion
- disability insurance $1 billion

From 2002 to 2003, company health insurance premiums jumped an average of 13.9 percent.[55] Insurance rates rise or fall with a company's "experience rating,"[56] which much like a credit rating, is based on how often people use a service.

Health solutions

Wellness programs are employer-sponsored efforts that promote employee health. Every company has particular needs, but group rate gym memberships and free health risk assessments (HRAs) are popular program amenities. Promoting "active transportation," such as biking and walking, in combination with nutrition programs are also popular wellness efforts. Companies with wellness programs typically see lower experience ratings and ultimately lower insurance rates.



[52]City of Portland Office of Transportation, http://www.trans.ci.portland.or.us/Environment/CleanAir/commuter.htm#Fair

[53] Current Estimates of the Economic Cost of Obesity in the United States, Obesity Research, 1998.

[54] Prevention Makes Common Cents: Estimated Economic Costs of Obesity to U.S. Business, American Journal of Health Promotion, 1998.

[55] Employer Health Benefits, 2003 Summary of Findings, Kaiser Family Foundation.

[56] Personal communication, Kerry Gilbreth, Metro HR, August 2005.

Automobiles: Flexible at Second Glance and Bridging Gaps Left by Other Modes

Given new developments in technology and policy, automobiles as a transportation option are now more flexible for people, whether they own an automobile or not. "Car-sharing" has grown across the country, which takes the concept of a library (borrowing something from a larger collection) and applies it to automobiles. In addition to creating another mobility option, car-sharing also lessens wear-and-tear on streets and highways when people are able to use automobiles more selectively for their travel needs.

Single Occupancy Vehicles (SOV)

Automobiles with driver-only enhanced/characterized by:

1. Off-peak travel
2. Long-distance or multiple-stop trips

Suitable for:
Density: All densities.
Transect: All land uses.

High Occupancy Vehicles (HOV)

Figure 21: HOV lane

HOV can refer to an alternative fuel vehicle (hybrid or flex-fuel), any automobile carrying more than one passenger or transit. HOV lanes are characterized by:

1. Exclusive lanes

2. Peak and off-peak travel
3. Directional travel (a driver picking up/dropping off passengers as they travel in a general direction)

Density: All densities provided adequate parking is provided.
LUPA Land Use: All land us

Reversible/Flexible Lanes

Figure 22: Reversible lanes, Hermitage Ave., Nashville

Travel lanes enhanced/characterized by:

1. Constrained right-of-way for road widening
2. \Prohibiting on-street parking during peak hours on major streets
3. Designating center lanes for peak directional travel

Density: All densities provided adequate parking is provided.
LUPA Land Use: All land uses adjacent to major streets.

Car-Sharing

Figure 23: Flexcar car-sharing, Oakland, California

Fleets of automobiles available to fee-paying members enhanced/characterized by:

1. Peak and off-peak travel
2. Variable travel needs/desires (ex. truck for moving, mini-van for school field-trip, hybrid-car for stop-and-go delivery)
3. Residents of high-density, transit supported areas who sometimes use automobiles
4. Public funding, or zoning incentives, may help leverage private investment for this tool.

Suitable for:
Density: Minimum 9 du/acre
Transect: District, Core, Center, Neighborhood

Parking: Always an Issue, Always a Cost

"Free parking" may come with the job, but as employers and employees both know, nothing is free. Developers also realize this whether they are building infill housing or a shopping center. Land and paving material costs vary greatly, with a few thousand dollars paving a rural acre to more than $1 million per acre in some urban areas. Because parking is ideally near its destination, finding inexpensive land for parking in an urban area is rare.

An average parking space measures 9 feet wide by 18 feet deep (162 square feet), a small portion of a 43,560 square foot acre, but one whose costs add up quickly. In addition to materials, machinery and labor, project planning, design, permits and financing typically increase project costs by 30-40% for a stand-alone project.[57], [58] Environmental costs like lost farmland and wildlife habitat, increased impervious surfaces and related stormwater management costs also add up.

Table 17 below illustrates examples of parking lot financial costs. This varies from about $250 per space if otherwise unused land is available, and construction and operating costs are minimal, to more than $2,000 for structured parking with attendants.

Table 17: Typical Parking Facility Costs

Type of Facility	Land Costs	Land Costs	Construction Costs	O & M Costs	Total Cost	Daily Cost
	Per Acre	*Per Space*	*Per Space*	*Annual, Per Space*	*Annual, Per Space*	*Per Space*
Suburban, On-Street	$50,000	$200	$2,000	$200	$408	$1.36
Suburban, Surface, Free Land	$0	$0	$2,000	$200	$389	$1.62
Suburban, Surface	$50,000	$455	$2,000	$200	$432	$1.80
Suburban, 2-Level Structure	$50,000	$227	$10,000	$300	$1,265	$5.27
Urban, On-Street	$250,000	$1,000	$3,000	$200	$578	$1.93
Urban, Surface	$250,000	$2,083	$3,000	$300	$780	$3.25
Urban, 3-Level Structure	$250,000	$694	$12,000	$400	$1,598	$6.66
Urban, Underground	$250,000	$0	$20,000	$400	$2,288	$9.53
CBD, On-Street	$2,000,000	$8,000	$3,000	$300	$1,338	$4.46
CBD, Surface	$2,000,000	$15,385	$3,000	$300	$2,035	$6.78
CBD, 4-Level Structure	$2,000,000	$3,846	$15,000	$400	$2,179	$7.26
CBD, Underground	$2,000,000	$0	$25,000	$500	$2,645	$8.82

This table illustrates the financial costs of providing parking facilities under various conditions. (CBD = Central Business District)[59]

[57] John **Dorsett**, "The Price Tag of Parking," *Urban Land*, May 1998, pp. 66-70.
[58] Mary **Smith**, "Parking," Chapter 14, *Transportation Planning Handbook*, Institute of Transportation Engineers (www.ite.org), 1999.
[59] Parking Pricing: Direct Charges for Using Parking Facilities, VPTI, http://www.vtpi.org/tdm/tdm26.htm

Parking Management

Given the cost and impact to community character from parking, effective parking management is an important Demand Management tool, characterized by[60]:

1. *Consumer choice*. People should have viable parking and travel options.
2. *User Information*. Motorists should have information on parking and travel options.
3. *Sharing*. Parking facilities should serve multiple users and destinations.
4. *Efficient utilization.* Parking facilities should be sized and managed so spaces are frequently occupied.
5. *Flexibility*. Parking plans should accommodate uncertainty and change (pay-as-you-go vs. monthly or yearly charges)
6. *Prioritization*. The most desirable spaces should be managed to favor higher-priority uses (ex. deliveries, short-term parking, etc.)
7. *Pricing*. As much as possible, users should pay directly for parking facilities they use.
8. *Peak management*. Special efforts should be made to deal with peak demand.
9. *Quality vs. quantity*. Parking facility quality should be considered as important as quantity, including aesthetics, security, accessibility and user information. Examples include liner buildings on parking garages and landscaping around parking lots to buffer them from the surrounding community.
10. *Comprehensive analysis*. All significant costs and benefits should be considered in parking planning.

[60] Parking Management: Strategies, Evaluation and Planning, VTPI, http://www.vtpi.org/park_man.pdf

APPENDIX

Appendix A – Plans Reviewed

The following plans and sources were reviewed for background information on land use/transportation implications, in addition to sources cited in footnotes throughout the document itself. This document is only a DRAFT at this time, and is subject to change pending further input from community and professional stakeholder members.

Plans/sources included:

Local media coverage (to highlight issues/trends and constraints/opportunities)

Nashville area (to establish existing conditions/policies)

- Metro sub-division regulations, Metro Planning Department, 2004
- Beating Gridlock: An Attainable Transportation Program for Middle Tennessee, Nashville Area Chamber of Commerce, 1999
- The Future of Neighborhoods, Neighborhoods Resource Center & Nashville Neighborhood Alliance, 2006
- Metro zoning code, Metro Planning Department, 1998
- Land Use Policy Application (LUPA), Metro Planning Department, 2004
- Community Plans from last 5 years, Metro Planning Department
- Cumberland Region Tomorrow Quality Growth Toolbox, ch. 4, Trans/Land-Use, 2006
- MPO LRTP, 2006
- TDOT LRTP, 2005
- Mobility 2010, Metro Planning Department, 1992
- Nashville-Davidson County Major Street and Collector Plan, Metro Planning Department, 2003 draft
- Plan of Nashville, Nashville Civic Design Center, 2005
- Nashville Area Chamber of Commerce Partnership 2010, focus on Goal 4: Infrastructure Development
- Concept 2010, 1992
- Nashville Regional Freight and Goods Movement, Nashville MPO, 2004.

Other cities/regions (to garner best practices)

- Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities, ITE-CNU, 2006
- Transportation Action Plan, Charlotte-Mecklenburg County, NC, 2006
- 2030 Transit Corridor System Plan, Charlotte Area Transit System, 2006
- Blueprint Denver, Denver City-County, CO, 2002
- From the Margins to the Mainstream: A Guide to Transportation Opportunities in Your Community, Surface Transportation Policy Project (STPP), 2006
- Best Development Practices: Doing the Right Thing and Making Money at the Same Time, 1995
- Regional Transportation Plan, METRO (Portland, Oregon), 2004

If there are plans/reports, etc. that are not included here and need consideration, please contact:

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