



# **IMPACTS OF POPULATION GROWTH ON SCHOOL FACILITIES**

## **Uneven Growth Patterns and the Challenge of Providing Adequate Public Education in Knox County**

October 31, 2006





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### EXECUTIVE SUMMARY

#### A. Introduction

Growth has occurred unevenly across Knox County. West and north areas have captured large shares of new investment, while central, east, and south have seen comparatively little growth, even pockets of decline. Much of the growth has occurred on previously undeveloped land, creating demand for new roads, utility lines, schools, law enforcement, and fire protection. The challenge to provide adequate education facilities is sizeable, and accommodating population growth by building new schools is not always a viable option.

#### B. Measures of School Facility Capacity

Facility capacity is an important measure of a school system's ability to adequately serve its population. Strains cause distraction and disruption, a poor environment for learning. Fiscal burdens are another concern. State mandates for teacher-pupil ratios can necessitate the hiring of additional faculty, or swelling enrollments might dictate the addition of portable classrooms, building wings, or entire facilities. Schools that operate well below capacity suffer problems of a different kind. Beyond the inefficiencies of operating a physical plant that is not fully utilized, underpopulated schools often are unable to offer courses, programs, and extra-curricular activities available at fully-utilized facilities.

Considerable debate occurs over the definition of capacity and the subsequent

evaluation of capacity-related problems. Several measures have been offered:

**1. Design Capacity:** Measured by counting the number of classrooms in a school and multiplying by maximum-allowable class size (based on mandated or recommended standards for teacher-pupil ratios). Limited by lack of attention paid to program-specific facilities.

**2. Square Footage Per Student:** Ratio of the number of students to total building floor area, compared to adopted standards: for example, 150 square feet per elementary student, 170 square feet per middle schooler, and 180 square feet for high school students. Mechanistic standard, detached from important programmatic considerations.

**3. Basic Education Program Capacity:** Maximum number of students a facility can accommodate after applying grade level or group averages (K-8) and programmatic offerings to teaching stations (9-12) within a facility. Does not allow for instructional needs of special or unique student groups.

**4. Functional Capacity:** Accommodates a school's programmatic issues and measures its ability to adequately serve its students. Current usage of educational program space and the pre-determined number of students assigned to each space comprise the basic formula for functional capacity. Excludes floor area dedicated to

special uses during school day, such as special education resource rooms, reading centers, computer laboratories, and performing arts centers.

#### C. Capacity Thresholds

Experts contend that facility strains begin when enrollment approaches 80 to 85 percent of designated limits because scheduling requirements make it impossible to assign students to all teaching stations every period of every day. *Utilization factors* that mark a standard threshold of capacity have been adopted by many school systems across the country.

Capacity measures and comparisons with current and future enrollments are presented for Knox County's high, middle, and elementary schools:

##### 1. High Schools

**a. Current conditions:** Among Knox County's 12 high schools, eight exceed one or more of the thresholds of capacity based on current enrollments in the system. Bearden, Farragut, and Karns, top each of the floor area, BEP, and functional capacity limits. These schools serve the high growth southwest and northwest portions of Knox County. On the other hand, enrollments at Austin East, Carter, Fulton, and South Doyle, which cover slow growth areas of central city, east county, and south county, remain below capacity in all three measures.

KCS officials look primarily at functional capacity in their evaluation of school overcrowding, and average daily membership at six facilities (Bearden, Central, Farragut, Karns, Powell, and West) exceeds the 85 percent threshold. Five of those schools serve northwest and southwest Knox, demonstrating the pressures that population expansion have placed on the local infrastructure. Three high schools, Bearden, Central, and Karns report more than 95 percent of functional capacity usage.

**b. Future conditions:** Systemwide, current high school enrollment exceeds its functional capacity threshold, combining for 87.3 percent of total available space. In 2005, the Knox County School Board and Knox County Commission approved plans for construction of a high school in the northwest part of the county. The new 257,581-square foot Hardin Valley High School will accommodate 2,100 students and ease overcrowding at Farragut, Karns, and Bearden. The school is scheduled to open in phases, beginning in Fall semester 2008, and it will be completely operational in Fall 2010. Also, an addition is nearing completion at Karns High School. The 23,450-square foot project should be ready in January, 2007.

Based on enrollment projections for Fall semester 2011/12, there will be 15,682 students in Knox County's public high schools. That represents a small decline in enrollment when compared to current figures, the result of changing local demographic conditions. In recent years, birth rates dropped as women of child bearing age (15 to 45 years old) were having fewer children. Smaller numbers of

kindergarten children entered the school system in the late-1990s and early-2000s, and as that cohort ages and progresses through grade levels, an enrollment trough will be seen in the system for a few years. It is assumed that local migration trends will continue at current levels, such that more families will move into Knox County than will move away, however, those arriving will bring fewer children.

Current construction projects will relieve growth pressures on area high schools over the next five years. More than 280,000 square feet of space will be added with the expansion at Karns High School and the construction of Hardin Valley High School. The added footage will bring the total high school space inventory to 2.94 million square feet. Projected enrollments call for 15,682 students in 2011/12, which equates to 188 square feet per student, above the standard of 180 square feet. Total high school system BEP capacity will rise from 20,766 to 23,286, meaning the proportion of BEP capacity in use will be 67.3 percent, comfortably below the 85 percent threshold. Similarly, the systemwide functional capacity will grow from 18,689 to 21,209, resulting in a 73.9 percent portion in use. With the additional capacity afforded by Hardin Valley High School, overcrowding problems at Bearden, Farragut, and Karns will be eliminated.

## 2. Middle Schools

**a. Current conditions:** Knox County's 14 middle schools currently operate with 1.87 million square feet of space, serving nearly 12,000 students. With a total BEP capacity of 14,322, the system runs at 83.4 percent capacity. Similar numbers are seen for

functional capacity. As a result, the middle school system as a whole has room to grow. However, that assessment is the net result of uneven distribution of middle school population. A few facilities are operating well below current capacities, such as South-Doyle, while others exceed functional capacity limits. Farragut, Gresham, Halls, Holston, and Powell are more than 90 percent occupied, and Karns Middle has reached the 85 percent threshold. Six facilities exceed BEP standards. Ten schools do not meet floor area standards, but only one, Powell Middle, is sharply below the minimum.

**b. Future conditions:** Major building additions are currently underway at Holston and Powell Middle Schools. Holston will add 61,000 square feet and will be able to accommodate 1,200 students. Preliminary estimates for the Powell addition show 100,000 square feet of new space, with an approximate capacity of 1,200 students. As a result, systemwide Fall enrollments in 2011/12 will be accommodated as BEP and functional capacity numbers will drop to about 81 percent in use, with Holston expected to report less than 70 percent occupancy and 64 percent at Powell. While these additions will relieve some strain for the system as a whole, capacity pressures will remain at Farragut, Gresham, Halls, and Karns. If attendance zones are adjusted in conjunction with the construction program, these additional capacity issues might be alleviated.

## 3. Elementary schools

**a. Current conditions:** The systemwide inventory of 50 elementary schools currently operates at 87.3 percent of total BEP

capacity, with 33 schools at or above the 85 percent threshold. Enrollments occupy 86.1 percent of total functional capacity, with 22 schools over the 85 percent mark. Fifteen facilities are more than 90 percent full, five of which are over 100 percent occupied. If the 85 percent threshold is to be maintained, the elementary school system must find additional room for 664 students under BEP guidelines, and 329 students under functional capacity definitions.

**b. Future conditions:** There are efforts underway to add space to the elementary system. A 125,000-square foot Cedar Bluff Elementary School is under construction and will replace the 105,520 square feet currently held in the primary and intermediate buildings. Capacity of the new school, however, will be smaller than the combined total of the two existing facilities. No plans have been announced for use of the existing buildings once the new school is open. Also under construction is a new Gibbs Elementary School, a 124,000-square foot building that will replace the 39,000-square foot structure that currently serves the area. With this replacement, there will be a net gain of 300 in functional capacity, for a total of 1,000 seats at Gibbs.

Even with the current construction projects, there will be elementary school capacity shortages by 2011/12. Systemwide BEP capacity will be 28,472, but 25,513 students are projected, resulting in a 1,312-seat shortfall if an 85 percent threshold is preferred. Functional capacity is expected to total 28,827, which will represent a shortage of 1,010 spaces.

#### **D. Growth Management**

Knox County is not alone in its struggle to balance the demands of growth and the provision of adequate public education facilities and services. Planners across the country have been developing growth management tools, innovative mechanisms that take two general forms: a) seek new funding sources beyond traditional means like sales or property taxes, which cannot keep pace with service and infrastructure demands; and, b) control the pace of growth so communities can add services at a rate that does not strain limited natural and economic resources.

Growth management principles are designed to achieve several major goals, two of which are particularly pertinent to this report:

**1. Location and Character of Community Expansion:** Managed by a community's zoning ordinance, subdivision regulations, and comprehensive plan, which specify where, when, how much, and what kind of development can occur. Supplementing these traditional measures, communities can manage growth using any number of additional techniques, such as urban growth boundaries, development policy areas, infill and redevelopment areas, and growth limits.

**2. Provision of Infrastructure:** Controlled timing of new service and infrastructure delivery, especially when trying to meet tight funding requirements. Functional plans, adequate public facility requirements, exactions, fees, special districts, and project rating systems are growth controls used in many places. Several of the regulatory and fiscal management tools noted above have

been authorized and adopted in communities across Tennessee.

#### **E. Comparison of Knox County to Places with Formal Development Controls**

As a result of rapid and unevenly distributed population growth in Knox County in recent years, many public schools have reached or exceeded facility capacity. School board options, such as rezoning, portable classrooms, reuse of space, and facility construction, can relieve some of the pressure. However, does local school infrastructure deficiency call for the kinds of legislated growth controls used in other places in Tennessee and elsewhere in the country? Knox County growth was compared to growth in 34 communities in Florida, Maine, Maryland, New Hampshire, North Carolina, and Tennessee where management devices, such as impact fees, adequate facilities taxes, and concurrency requirements, have been implemented.

**1. General Population:** Between 1980 and 2000, total population growth in Knox County reached 62,000 (a nearly 20 percent increase), much of which occurred in the 1990s when a 14 percent increase was recorded. In comparison to the 34 growth control communities, Knox County's net increase earned a ranking of 20<sup>th</sup>. Its rate of change, however, sent it down the list to 30<sup>th</sup> place. When compared to the 14 selected Tennessee counties with growth management policies, Knox led all but three in net growth.

**2. Population Under 20 Years of Age:** Persons aged 0 to 19 years represent the school age population cohort of a community. In Knox County, the 20-year growth trend showed a 3,400 person

increase, a 3.6 percent change, the net result of 12 percent growth in the 1990s and decline in the decade prior. In comparison to the growth control communities, Knox was at the bottom of the list, ranking 33<sup>rd</sup> out of 34.

**3. Public School Enrollment:** Knox County public schools added about 7,500 students during the 1990s. In terms of rate of change, a sizeable decline in the 1980s offset the increase in the 1990s, resulting in a 20-year net of 5.3 percent decline. Accordingly, Knox County was at the bottom of the ranks for total and percentage change when compared to the selected growth control communities. However, if the growth of the 1990s is considered separately, Knox County's increase earned a 5<sup>th</sup> place ranking in Tennessee.

**4. Mixed Findings:** Local population and enrollment trends show mixed results. When compared to communities with growth measures in place, Knox County falls toward the bottom of rankings for population change, indicating that pressures locally are not as intense as those felt elsewhere. However, development in Knox has not been distributed evenly. Southwest, northwest, and north areas have seen rates of increase that rival those in many of the communities that have taken formal action to control the timing and direction of investment.

## **F. Options to Tackle School Overcrowding**

**1. Operational Choices:** Several local schools, in older parts of the city and other areas that have seen little new residential investment, have excess capacity. Re-alignment of school attendance zones could take children out of overcrowded schools and redistribute them to zones with available space. However, children must travel greater distances to school, requiring additional bus service; re-assignment of children from one school to another incurs sizeable administrative expense; and, rezoning causes public consternation.

Facility operation strategies, such as the addition of staff and portable classrooms and reconfiguration of space, have relieved growth pressures at some local schools. In areas of strongest growing pains though, facility expansion and new school construction were undertaken, but the fiscal costs were substantial.

## **2. Long-Term Opportunities for a Better Planning Environment: A Toolkit of Options**

**a. Cooperative efforts:** Zoning and subdivision review processes could benefit from more rigorous guidelines and greater cooperation between planners, educators, and elected officials. The environment for collaborative planning is improving though. For the past three years, MPC staff members have worked closely with KCS and formalized a planning assistance program.

**b. Interlocal agreement:** School board staff members could participate in local land use decisions and serve on technical

committees. Local planners and government officials could participate in the school board's long-range planning and facility location activities.

**c. Joint use agreements:** Recognize the role of school facilities as community assets serving multiple functions: meeting places, parks, recreation centers, libraries, and other shared uses.

**d. Impact analysis in review of development proposals:** Collaborate with school officials on proposal recommendations and routinely share development data (anticipated number of building units, additional population, school enrollments, facility capacities, enrollment projections, development projections).

**e. School facilities element in the comprehensive plan.**

**f. Requirement of school site dedication:** Land set aside by developers of large-scale residential projects.

**g. Financing options like school impact fees.**

The Metropolitan Planning Commission currently accommodates several of the action items listed above, and additional measures could be considered. Planners and educators must work with elected officials on school facility siting and capacity matters and foster an environment of understanding about the roles development activity, land use and facility planning, and capital improvement programming have on current and future school needs.

# IMPACTS OF POPULATION GROWTH ON SCHOOL FACILITIES

## Uneven Growth Patterns and the Challenge of Providing Adequate Public Education in Knox County

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### I. INTRODUCTION

Knox County's population has been growing steadily over the past 15 years. West and north areas have captured large shares of new investment, while central, east, and south Knox have seen comparatively little expansion, even pockets of decline. Exacerbating the issue is the fact that much of the growth has occurred on previously undeveloped land. As a result, new roads, utility lines, schools, law enforcement, and fire protection are needed, a challenge that confronts local taxpayers increasingly each year. The focus of this report is the impact of growth on Knox County's public school system.

The provision of adequate education facilities is a sizeable fiscal responsibility, and accommodating population growth by building schools is not always a viable option. Careful attention must be paid to the effects of growth before it occurs. Accordingly, growth and its impacts on school infrastructure are assessed in this report. An overview of local public education facilities is presented, including a look at changing enrollments and facility limitations. Considerable attention is paid to the concept of school capacity, with several definitions discussed. Finally, because pressures on public education services are not unique to Knox County, planning options used in other communities around the country are examined for applicability here.

### II. KNOX COUNTY'S PUBLIC SCHOOL FACILITY CAPACITIES

#### A. *Uneven Distribution of Growth*

Knox County witnessed population increase over the past 15 years. While growth was steady, averaging 1.4 percent annually, the gains were distributed unevenly across the county. Analysis of sector-level population change and construction activity revealed a distinct pattern of expansion that strongly favored southwest, northwest, and north portions of the county, while other areas, especially sectors in the city, saw little new growth, even decline. Patterns of school-age population distribution mirrored the general population, and half of all public school students resided in the three growth-centered sectors west and north of the city. (Detailed figures on population, development activity, and school enrollment trends are presented in Appendix A.)

Much of the residential investment that occurred over the past 15 years took place on previously undeveloped land. As a result, public infrastructure had to grow with the new population. The time and money demands to provide infrastructure have been substantial, and Knox County has been challenged to keep pace. Schools in particular have felt the pressure, as many education facilities in areas of rapid growth have difficulty accommodating enrollment increases. New school construction has taken place in the past few years in southwest and northwest Knox County, with facilities such as A.L. Lotts Elementary,

Hardin Valley Elementary, Amherst Elementary, West Valley Middle School, and Hardin Valley High School (currently under construction), added to the local inventory. A new facility to replace Cedar Bluff Primary and Elementary Schools is being built, and enrollment estimates for the school indicate it will open at or near capacity. Expansions and portable classrooms also have occurred at many west and north schools to handle growth. Current trends in population growth and land development indicate continued pressure in southwest, northwest, and north Knox County over the next several years.

At the same time that burgeoning enrollments have pushed many facilities to capacity and beyond, several other area schools have been operating below capacity. Shifting population and uneven distribution of growth have contributed to enrollment declines in many of Knoxville's older, established neighborhoods.

#### B. *Measures of School Facility Capacity*

Facility capacity is an important measure of a school system's ability to adequately serve its population. Strains on capacity cause problems with the day to day education of students – for example, class sizes that exceed accepted teacher-pupil ratios restrict attention to individual student needs; or, auditoriums, gymnasiums, libraries, and storage rooms might be called upon to serve as classroom space. Fiscal burdens are another concern. State mandates for teacher-pupil ratios might

necessitate the hiring of additional faculty, or swelling enrollments might dictate the addition of portable classrooms, building wings, or entire facilities. Excessive pressures on facilities and human resources translate to conditions of distraction and disruption, a poor environment for learning. Schools that operate well below capacity suffer problems of a different kind. Beyond the inefficiencies of operating a physical plant that is not fully utilized, under-populated schools often are unable to offer courses, programs, and extra-curricular activities available at fully-utilized facilities.

Facility capacity is difficult to assess because there exists considerable debate over its definition and subsequent evaluation of capacity-related problems. Several measures have been offered, each with generally accepted norms for assessment. The debate, however, lies in the selection of an appropriate definition of capacity, often based on which side of the issue one stands when considering the impacts of overcrowded or underutilized schools. The more widely adopted measures of school capacity are presented here:

### **1. Design Capacity**

Design capacity is measured by counting the number of classrooms in a school and multiplying by maximum-allowable class size (based on mandated or recommended standards for teacher-pupil ratios). It is a straightforward and commonly used gauge for schools with self-contained classrooms of similar size, however, it is limited by its lack of proper attention paid to program-specific facilities (DeJong and Craig, 1999). Specialized spaces, such as science labs, art rooms, media centers, and music rooms, are not used every period of every day and, therefore, when included in the measure of

design capacity, total accommodations are overstated. Further, it would not be acceptable to include temporary or portable classrooms in the calculation of design capacity. Only footage in permanent structures should be included – temporary space creates temporary capacity which can mask real facility needs (Chan, 1998).

### **2. Square Footage Per Student**

Another measure of the carrying capacity of a school, one often used by architects in designing new facilities, is the ratio of the number of students to total building floor area. That ratio is then compared to generally accepted standards for elementary, middle, and high school facilities. The District of Columbia, for example, uses a standard of 150 square feet per elementary student, 170 square feet per middle schooler, and 180 square feet per high school students (Neighborhood Capital Budget Group, 2005a). Like design capacity, this is an example of a mechanistic standard, detached from important programmatic considerations.

### **3. Basic Education Program Capacity**

The Knox County Schools system is a grade-based structure with K-5, 6-8, and 9-12 elements. The K-5 component provides a self-contained instructional strategy where students are primarily assigned a single teacher. Enrichment activities, such as art, music, and physical education, are included in their program in small increments each week. Teaching stations for these activities are typically unused for a significant time each day. However, the nature of the associated learning content often requires equipment and spaces not conducive to a traditional classroom. Under State of Tennessee's *Basic Education Program* (BEP) guidelines, grades K-3 must adhere

to a pupil-teacher ratio (PTR) not exceeding an average of 20.49. Grades 4 and 5 allow a PTR of 25.49.

The middle grades are structured around small learning communities, with a team of teachers assigned to areas of professional expertise. The BEP mandate for PTR is 25.49 for grade 6 and 30.49 for grades 7 and 8. Students rotate among their team of teachers for academic core subjects. Core teachers provide instruction within their teams for about 75 percent of the school day. Students participate in arts programs for the remaining time each day, throughout the school year. Core teaching stations are vacant during these times. Related arts opportunities exceed offerings at the K-5 level and include computer skills, band, choir, and technology education. A schedule is created at each middle school to accommodate the total school population. The majority of teaching stations dedicated to related arts programming provide instruction for more than 85 percent of any given school day. Most arts stations are not suited for academic core instruction.

High schools (grades 9-12) have a much different structure. Approximately one-half of each student's coursework is required and scheduled for them. Students are allowed to choose an individual path of coursework for the remaining half. These courses can be completed with multiple grade-level students in the same class. Academic, arts, career/technical education, and other elective offerings are treated equally in the master schedule. All teaching stations throughout the facility affect program capacity. BEP ratio requirements for high schools vary by instructional area (Table 1).

<b>TABLE 1 TENNESSEE BASIC EDUCATION PROGRAM (BEP) REQUIREMENTS FOR HIGH SCHOOLS</b>	
<b>INSTRUCTIONAL AREA</b>	<b>PUPIL-TEACHER RATIO</b>
Art	30
Band	No Limit
Career and Technical Education	20
Choral Music	No Limit
Drivers Education	20
Foreign Language	30
General Music	30
Language Arts	30
Math	30
Physical Education, Health, Wellness	30
Physical Sciences	30
ROTC	20
Social Sciences	30

Source: Knox County Schools, 2005.

<b>TABLE 2 TENNESSEE BASIC EDUCATION PROGRAM (BEP) CAPACITY STANDARDS FOR KNOX COUNTY HIGH SCHOOLS</b>		
<b>HIGH SCHOOL</b>	<b>TOTAL DAILY MAXIMUM CAPACITY</b>	<b>ADJUSTED DAILY CAPACITY (1 OF 4 BLOCKS)<sup>1</sup></b>
Austin East	5,168	1,486
Bearden	8,232	2,220
Carter	5,197	1,418
Central	6,399	1,574
Farragut	9,974	2,533
Fulton	5,185	1,409
Gibbs	4,817	1,375
Halls	5,823	1,560
Karns	8,168	2,112
Powell	5,708	1,437
South Doyle	6,634	1,860
West	6,793	1,782
Total	78,098	20,766

<sup>1</sup>Capacity after BEP adjustments and allocation to one of four scheduling blocks.

Source: Knox County Schools, 2005.

To summarize, the Basic Education Program capacity is the maximum number of students a facility can accommodate after applying grade level or group averages (K-8) and programmatic offerings to teaching stations (9-12) within a facility (Grubb, 2005). (To illustrate, BEP capacity figures for Knox County's 12 high schools are shown in Table 2.) According to educators, including Knox County Schools (KCS) staff, BEP capacity measures fall short in adequately assessing the capabilities of a facility to provide a proper learning environment. From KCS research, such measures do not allow for instructional needs of special or unique student groups, and they fail to consider the fact that students do not fit into predetermined groups consistent with BEP mandates.

#### **4. Functional Capacity**

In response to the shortcomings of the three capacity measures outlined above, a fourth method has been advocated locally and elsewhere across the country. Functional capacity accommodates a school's programmatic issues and measures its ability to adequately serve its students – current usage of educational program space and the pre-determined number of students assigned to each space comprise the basic formula for functional capacity. Often called a more realistic measure by school administrators, functional capacity is lower than design capacity because it excludes floor area dedicated to special uses during a school day, such as special education resource rooms, reading centers, computer

laboratories, and performing arts centers (Planning Advocates, 2003).

Knox County Schools staff have defined functional capacity as the number of students a school can accommodate while simultaneously: a) creating a safe and grade-level appropriate learning environment, b) prioritizing curriculum delivery and instructional opportunities to meet student need, c) adhering to pupil-teacher ratio mandates, d) allowing student/family program choices when applicable, e) maximizing teaching station utilization, f) applying variables for site-based program factors, g) adjusting capacity socio-economic status, and, h) applying the Knox County Schools "best-practice capacity benchmark."

KCS generated a set of figures for functional capacity for area elementary, middle, and high schools using a locally developed facility model. Staff members examined utilization of each of their instructional

facilities in depth over the past eighteen months, with individual building-level administrators contributing data and analysis. (To demonstrate functional capacity measurement, components and

resultant capacities for Knox County's public high schools are presented in Table 3. Also, sub-elements of the Knox County Schools *Functional Capacity Model* for high schools are shown in Appendix B).

**TABLE 3  
FUNCTIONAL CAPACITY MODEL FOR KNOX COUNTY HIGH SCHOOLS**

COMPONENTS	AUSTIN EAST	BEARDEN	CARTER	CENTRAL	FAR-RAGUT	FULTON	GIBBS	HALLS	KARNS	POWELL	SOUTH DOYLE	WEST
<b>BEP Total Daily Cap. (all blocks)</b>	<b>5,168</b>	<b>8,232</b>	<b>5,197</b>	<b>6,399</b>	<b>9,974</b>	<b>5,185</b>	<b>4,817</b>	<b>5,823</b>	<b>8,168</b>	<b>5,708</b>	<b>6,634</b>	<b>6,793</b>
<b>Capacity Adjustments</b>												
Choral Program Adjustment	0	-126	-8	-147	-23	-12	0	-28	-78	-33	0	-90
Band Program Adjustment	0	-54	-112	-73	-209	0	-17	-94	-81	-35	-54	-36
Bonus Period Adjustment	-5	-152	-45	-65	-311	-36	0	-20	-40	-71	0	0
Vacant Teaching Stations Adj.	1,440	980	640	180	700	500	700	560	480	180	860	460
Capacity Adjustment Totals	1,435	648	475	-105	157	452	683	418	281	41	806	334
<b>BEP Adj. Daily Cap. (all blocks)<sup>1</sup></b>	<b>6,603</b>	<b>8,880</b>	<b>5,672</b>	<b>6,294</b>	<b>10,131</b>	<b>5,637</b>	<b>5,500</b>	<b>6,241</b>	<b>8,449</b>	<b>5,749</b>	<b>7,440</b>	<b>7,127</b>
SES Best Practice Factor	-660	0	0	0	0	0	0	0	0	0	0	0
Capacity After SES Adjustment	5,943	8,880	5,672	6,294	10,131	5,637	5,500	6,241	8,449	5,749	7,440	7,127
<b>BEP Adj. Daily Cap. (1 of 4 blocks)<sup>2</sup></b>	<b>1,486</b>	<b>2,220</b>	<b>1,418</b>	<b>1,574</b>	<b>2,533</b>	<b>1,409</b>	<b>1,375</b>	<b>1,560</b>	<b>2,112</b>	<b>1,437</b>	<b>1,860</b>	<b>1,782</b>
Average Daily Membership	737	2,009	966	1,338	2,216	1,086	924	1,157	1,826	1,188	1,363	1,436
<b>BEP (Best Practice) Capacity (%)<sup>3</sup></b>	<b>49.6%</b>	<b>90.5%</b>	<b>68.1%</b>	<b>85.0%</b>	<b>87.5%</b>	<b>77.1%</b>	<b>67.2%</b>	<b>74.2%</b>	<b>86.5%</b>	<b>82.7%</b>	<b>73.3%</b>	<b>80.6%</b>
90% Best Practice Factor <sup>4</sup>	-149	-222	-142	-157	-253	-141	-138	-156	-211	-144	-186	-178
<b>Functional Capacity<sup>5</sup></b>	<b>1,337</b>	<b>1,998</b>	<b>1,276</b>	<b>1,417</b>	<b>2,280</b>	<b>1,268</b>	<b>1,237</b>	<b>1,404</b>	<b>1,901</b>	<b>1,293</b>	<b>1,674</b>	<b>1,604</b>
Average Daily Membership (2006/07)	768	1,953	960	1,377	2,162	1,035	994	1,185	1,893	1,211	1,350	1,421
<b>Functional Capacity (%)<sup>6</sup></b>	<b>57.4%</b>	<b>97.7%</b>	<b>75.2%</b>	<b>97.2%</b>	<b>94.8%</b>	<b>81.7%</b>	<b>80.3%</b>	<b>84.4%</b>	<b>99.6%</b>	<b>93.6%</b>	<b>80.6%</b>	<b>88.6%</b>

<sup>1</sup>Add Capacity Adjustment Total to BEP Total Daily Capacity (all blocks) to generate BEP Adjusted Daily Capacity (all blocks).

<sup>2</sup>Divide Capacity After SES Adjustment by four to generate BEP Adjusted Daily Capacity (1 of 4 blocks), the student capacity of one scheduling block.

<sup>3</sup>BEP (Best Practice) Capacity (%) is generated by dividing Average Daily Membership by BEP Adjusted Daily Capacity (1 of 4 blocks), showing the portion of BEP (Best Practice) Capacity in use.

<sup>4</sup>KCS applies a 90% best practice factor to adjust BEP capacity downward to accommodate teaching station limitations.

<sup>5</sup>Net facility capacity after best practice adjustment to BEP Adjusted Daily Capacity (1 of 4 blocks).

<sup>6</sup>Functional Capacity (%) is generated by dividing Average Daily Membership by Functional Capacity, showing the portion of Functional Capacity in use.

Source: Knox County Schools, 2005.

### **C. Capacity Thresholds**

Education researchers and practitioners assert that final figures for capacity, whether functional, design, or other, can still overstate the ability to provide a good learning environment for students. Many experts contend that facility strains begin when enrollment approaches 80 to 85 percent of designated limits because scheduling requirements make it impossible to assign students to all teaching stations every period of every day. *Utilization factors* that mark a standard threshold of capacity have been adopted by many school systems across the country, such as Chicago Public Schools (DeJong and Craig, 1999; Neighborhood Capital Budget Group, 2005a; Planning Advocates, 2003).

### **D. Need to Regularly Update Capacity Figures**

Definition of school capacity presents an additional challenge in that capacity figures are subject to change from year to year and semester to semester. Change is the result of factors such as compliance with revised building codes, variations in educational programs, amendments to state mandates on class size, and class scheduling (Chan, 1998). Updates should be accompanied by audits of school buildings to make certain that all space is used efficiently. Audits can produce reclaimed capacity – an unused shop might be converted to a special education room or storage areas renovated for office space.

### **E. Summary of Facility Capacities of Knox County Schools**

Given the sizeable fiscal responsibilities in operating a school system, it is important to assess real needs for space. Not all community and education planners agree,

however, on the appropriate set of capacity figures to use. Some are satisfied with the infrastructure measures provided by design capacity, while others look at standards for average floor space allotted per student. Still others rely on functional capacity to characterize the ability to provide a quality environment for learning. Since there is debate on the best measure to use, three are considered in the analysis offered in this report: floor area, BEP, and functional capacity.

The floor area standards used in this study are modeled after the District of Columbia system: 150 square feet per elementary student, 170 square feet per middle school student, and 180 square feet per high school student. As recommended by professional education researchers, only footage in main facilities is included. Space in portable classrooms is excluded from the analysis because it is intended to be temporary. In practice, portable classrooms have become permanent structures at many local campuses, however, their original purpose was to provide a temporary solution to facility overcrowding. For this analysis, it is assumed that portables will be removed at some point in the future if no longer needed.

BEP and functional capacity numbers were provided by Knox County Schools staff for each elementary, middle, and high school. If a facility has reached 100 percent or more of its BEP or functional capacity, it is fully occupied. However, KCS staff and other professional educators warn that when enrollments reach 85 percent of BEP and functional limits, it is time to start looking at anticipated future enrollments, evaluate potential space needs, and consider options

to alleviate capacity strains. Accordingly, the analysis here uses the 85 percent capacity threshold to identify facilities that warrant further attention, *even though the school may or may not be fully occupied.*

Presented in the following tables are comparisons of current and future enrollment to the stated square footage, BEP, and functional capacities for public high, middle, and elementary schools in Knox County.

## **1. High Schools**

**a. Current conditions:** Among Knox County's 12 high schools, eight exceed one or more of the thresholds of capacity based on current enrollments in the system (Table 4). Bearden, Farragut, and Karns, top each of the floor area, BEP, and functional capacity limits. These schools serve the high growth southwest and northwest portions of Knox County. On the other hand, enrollments at Austin East, Carter, Fulton, and South Doyle, which cover slow growth areas of central city, east county, and south county, remain below capacity in all three measures.

KCS officials look primarily at functional capacity in their evaluation of school overcrowding, and average daily membership at six facilities (Bearden, Central, Farragut, Karns, Powell, and West) exceeds the 85 percent threshold. Five of those schools serve northwest and southwest Knox, demonstrating the pressures that population expansion have placed on the local infrastructure. Three high schools, Bearden, Central, and Karns report more than 95 percent of functional capacity usage.

**b. Future conditions:** Systemwide, current high school enrollment exceeds its functional capacity threshold, combining for 87.3 percent of total available space. In 2005, the Knox County School Board and Knox County Commission approved plans for construction of a high school in the northwest part of the county. The new 257,581-square foot Hardin Valley High School will accommodate 2,100 students and ease overcrowding at Farragut, Karns, and Bearden. The school is scheduled to open in phases, beginning in Fall semester 2008, and it will be completely operational in Fall 2010. Also, an addition is nearing completion at Karns High School. The 23,450-square foot project should be ready in January, 2007.

To evaluate the impacts of the construction activity and other future conditions, a series of enrollment projections was prepared for all local schools, covering each year from 2007/08 through 2016/17. Several factors were used in the generation of the projections: current enrollments were carried forward through the system, grade by grade; adjustments were made for in- and out-migration of population; new students were added to the system at the kindergarten level based on current populations aged 0 to 5 years old; and, forecasted births were used in later years of the projection period to populate kindergarten cohorts.

Based on projections for Fall semester 2011/12, there will be 15,682 students

enrolled in Knox County's public high schools (Table 5). That represents a small decline in enrollment when compared to current figures, the result of changing local demographic conditions. In recent years, birth rates dropped as women of child bearing age (15 to 45 years old) were having fewer children. Smaller numbers of kindergarten children entered the school system in the late-1990s and early-2000s, and as that cohort ages and progresses through grade levels, an enrollment trough will be seen in the system for a few years. It is assumed that local migration trends will continue at current levels, such that more families will move into Knox County than will move away, however, those arriving will bring fewer children.

If none of the construction projects currently underway had been approved, the enrollment projections show that only six of the area's 12 high schools would meet all standards for facility capacity in 2011/12. Farragut and Karns would exceed all measures, just as they do presently. Bearden, Central, Gibbs, and Halls would exceed one or more capacity thresholds in the next five years. Systemwide high school enrollment would approach its functional capacity warning level as 83.9 percent of total space would be in use.

The recent construction projects will relieve growth pressures on several area high schools over the next five years. More than 280,000 square feet of space will be added with the expansion at Karns High School

and the construction of Hardin Valley High School. The added footage will bring the total high school space inventory to 2.94 million square feet (not including temporary portable classrooms). Projected enrollments call for 15,682 students in 2011/12, which equates to 188 square feet per student, above the standard of 180 square feet. Total high school system BEP capacity will rise from 20,766 to 23,286, meaning the proportion of BEP capacity in use will be 67.3 percent, comfortably below the 85 percent threshold. Similarly, the systemwide functional capacity will grow from 18,689 to 21,209, resulting in a 73.9 percent portion in use.

With the additional capacity afforded by Hardin Valley High School, overcrowding problems at Bearden, Farragut, and Karns will be eliminated. Currently, the three schools comprise 6,008 total enrollment in 648,440 square feet of space, or an average of 108 square feet per student (Table 6). The three facilities have a total BEP capacity of 6,865, therefore, 87.5 percent is in use. Functional capacity totals 6,179, or 97.2 percent in use. Since the new school will handle 2,100 students, the re-alignment of high school zones upon construction completion will take the extra students out of the overcrowded schools, bringing average floor area per student up to 154 square feet, BEP capacity to 64.1 percent in use, and functional capacity to 69.2 percent in use by Fall semester 2011/12.

**TABLE 4  
HIGH SCHOOL CAPACITY AND CURRENT AVERAGE DAILY MEMBERSHIP (ADM) COMPARISONS**

SCHOOL	ADM 2006/07	FLOOR AREA PER STUDENT (SQ. FT.) <sup>1</sup>	FLOOR AREA PER STUDENT SHORTAGE/ SURPLUS (SQ. FT.)	BEP CAPACITY	PROPORTION OF BEP CAPACITY IN USE (%)	FUNCTIONAL CAPACITY	PROPORTION OF FUNC. CAPACITY IN USE (%)	EXCEEDED <sup>2</sup>		
								FA	BEP	FUNC
Austin East High	768	348	168	1,486	51.7	1,337	57.4	0	0	0
Bearden High	1,953	129	-51	2,220	88.0	1,998	97.7	FA	B	F3
Carter High	960	197	17	1,418	67.7	1,276	75.2	0	0	0
Central High	1,377	187	7	1,574	87.5	1,417	97.2	0	B	F3
Farragut High	2,162	100	-80	2,533	85.4	2,280	94.8	FA	B	F2
Fulton High	1,035	228	48	1,409	73.5	1,268	81.7	0	0	0
Gibbs High	994	151	-29	1,375	72.3	1,237	80.3	FA	0	0
Halls High	1,185	130	-50	1,560	76.0	1,404	84.4	FA	0	0
Karns High	1,893	95	-85	2,112	89.6	1,901	99.6	FA	B	F3
Powell High	1,211	186	6	1,437	84.2	1,293	93.6	0	0	F2
South-Doyle High	1,350	200	20	1,860	72.6	1,674	80.6	0	0	0
West High	1,421	186	6	1,782	79.7	1,604	88.6	0	0	F1
<b>Total</b>	<b>16,308</b>	<b>163</b>	<b>-17</b>	<b>20,766</b>	<b>78.5</b>	<b>18,689</b>	<b>87.3</b>	<b>FA</b>	<b>0</b>	<b>F1</b>

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>Standards: FA = floor area capacity (standard = 180 square feet per student); BEP = Basic Education Program capacity (threshold = 85 percent of total); FUNC = functional capacity (threshold = 85 percent of total).

School is marked FA for floor area standard exceeded, B for BEP threshold exceeded, F1 for 85.0-89.9 percent functional capacity exceeded, F2 for 90.0-94.9 percent exceeded, F3 for 95.0 percent or more functional capacity exceeded.

Compiled by the Knoxville/Knox County Metropolitan Planning Commission using Knox County Schools and Public Building Authority data.

**TABLE 5  
HIGH SCHOOL CAPACITY AND PROJECTED (5-YEAR) ENROLLMENT COMPARISONS**

SCHOOL	PROJ. ENROL. 2011/12	FLOOR AREA PER STUDENT (SQ. FT.) <sup>1</sup>	FLOOR AREA PER STUDENT SHORTAGE/ SURPLUS (SQ. FT.)	BEP CAPACITY	PROPORTION OF BEP CAPACITY IN USE (%)	FUNCTIONAL CAPACITY	PROPORTION OF FUNC. CAPACITY IN USE (%)	EXCEEDED <sup>2</sup>		
								FA	BEP	FUNC
Austin East High	784	341	161	1,486	52.8	1,337	58.6	0	0	0
Bearden High	1,809	139	-41	2,220	81.5	1,998	90.5	FA	0	F2
Carter High	864	218	38	1,418	61.0	1,276	67.7	0	0	0
Central High	1,216	212	32	1,574	77.3	1,417	85.8	0	0	F1
Farragut High	2,223	98	-82	2,533	87.8	2,280	97.5	FA	B	F3
Fulton High	1,008	234	54	1,409	71.5	1,268	79.5	0	0	0
Gibbs High	1,136	132	-48	1,375	82.6	1,237	91.9	FA	0	F2
Halls High	1,206	128	-52	1,560	77.3	1,404	85.9	FA	0	F1
Karns High	1,985	91	-89	2,112	94.0	1,901	104.4	FA	B	F3
Powell High	1,095	206	26	1,437	76.2	1,293	84.7	0	0	0
South-Doyle High	1,155	234	54	1,860	62.1	1,674	69.0	0	0	0
West High	1,200	220	40	1,782	67.3	1,604	74.8	0	0	0
<b>Total</b>	<b>15,682</b>	<b>170</b>	<b>-10</b>	<b>20,766</b>	<b>75.5</b>	<b>18,689</b>	<b>83.9</b>	<b>FA</b>	<b>0</b>	<b>0</b>

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>Standards: FA = floor area capacity (standard = 180 square feet per student); BEP = Basic Education Program capacity (threshold = 85 percent of total); FUNC = functional capacity (threshold = 85 percent of total).

School is marked FA for floor area standard exceeded, B for BEP threshold exceeded, F1 for 85.0-89.9 percent functional capacity exceeded, F2 for 90.0-94.9 percent exceeded, F3 for 95.0 percent or more functional capacity exceeded.

Compiled by the Knoxville/Knox County Metropolitan Planning Commission using Knox County Schools and Public Building Authority data.

**TABLE 6  
IMPACTS OF FUTURE BUILDING COMPLETIONS ON SCHOOL SYSTEM CAPACITIES: HIGH SCHOOLS**

<b>Analysis</b>	<b>Enrollment</b>	<b>Floor Area<sup>1</sup></b>	<b>Floor Area Per Student</b>	<b>BEP Capacity</b>	<b>BEP Capacity In Use (%)</b>	<b>Functional Capacity</b>	<b>Functional Capacity In Use (%)</b>
<b>Systemwide</b>							
Current	16,308	2,661,530	163	20,766	78.5	18,689	87.3
Forthcoming Additions <sup>2</sup>							
Karns		23,450		420		420	
Hardin Valley		257,581		2,100		2,100	
By 2011/12 <sup>3</sup>	15,682	2,942,561	188	23,286	67.3	21,209	73.9
By 2016/17	16,114	2,942,561	183	23,286	69.2	21,209	76.0
<b>West County High Schools</b>							
Current							
Total	6,008	648,440	108	6,865	87.5	6,179	97.2
Bearden	1,953	251,576	129	2,220	88.0	1,998	97.7
Farragut	2,162	216,864	100	2,533	85.4	2,280	94.8
Karns	1,893	180,000	95	2,112	89.6	1,901	99.6
Forthcoming Additions							
Total		281,031		2,520		2,520	
Karns		23,450		420		420	
Hardin Valley		257,581		2,100		2,100	
By 2011/12							
Total	6,017	929,471	154	9,385	64.1	8,699	69.2
By 2016/17							
Total	7,141	929,471	130	9,385	76.1	8,699	82.1
<b>Karns</b>							
Current	1,893	180,000	95	2,112	89.6	1,901	99.6
Forthcoming Addition		23,450		420		420	
By January, 2007 <sup>4</sup>	1,893	203,450	107	2,532	74.8	2,321	81.6

Notes:

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>For the purposes of this analysis, it is assumed that the capacity added by building programs at Karns and Hardin Valley will fully accommodate BEP and functional requirements.

<sup>3</sup>Enrollment projections based on Moderate Growth Scenario developed by PEFA, October, 2006.

<sup>4</sup>Completion of the Karns High School addition is scheduled for December, 2006, with occupancy anticipated for January, 2007.

## 2. Middle Schools

**a. Current conditions:** Knox County's 14 middle schools currently operate with 1.87 million square feet of space, serving nearly 12,000 students (Table 7). With a total BEP capacity of 14,322, the system runs at 83.4 percent capacity. Similar numbers are seen for functional capacity. As a result, the middle school system as a whole has room to grow. However, that assessment is the net result of uneven distribution of middle school population. A few facilities are operating well below current capacities, such as South-Doyle, while others exceed functional capacity limits. Farragut, Gresham, Halls, Holston, and Powell are more than 90 percent occupied, and Karns Middle has reached the 85 percent threshold. Six facilities exceed BEP

standards. Ten schools do not meet floor area standards, but only one, Powell Middle, is sharply below the minimum.

**b. Future conditions:** Major building additions are currently underway at Holston and Powell Middle Schools. In the absence of these efforts, projections indicate systemwide middle school enrollment would reach the 85 percent threshold for functional capacity by the 2011/12 school year (Table 8). BEP capacity would also be reached, and floor area requirements would show a shortfall of 18 square feet per student. Among individual schools, six would exceed BEP and functional limits, four of which would surpass 100 percent usage.

As noted though, Holston and Powell Middle Schools are currently undergoing

expansion. Holston will add 61,000 square feet and will be able to accommodate 1,200 students (Table 9). Preliminary estimates for the Powell addition show 100,000 square feet of new space, with an approximate capacity of 1,200 students. As a result, systemwide Fall enrollments in 2011/12 will be accommodated as BEP and functional capacity numbers will drop to about 81 percent in use, with Holston expected to report less than 70 percent occupancy and 64 percent at Powell. While these additions will relieve some strain for the system as a whole, capacity pressures will remain at Farragut, Gresham, Halls, and Karns. If attendance zones are adjusted in conjunction with the construction program, these additional capacity issues might be alleviated.

**TABLE 7  
MIDDLE SCHOOL CAPACITY AND CURRENT AVERAGE DAILY MEMBERSHIP (ADM) COMPARISONS**

SCHOOL	ADM 2006/07	FLOOR AREA PER STUDENT (SQ. FT.) <sup>1</sup>	FLOOR AREA PER STUDENT SHORTAGE/ SURPLUS (SQ. FT.)	BEP CAPACITY	PROPORTION OF BEP CAPACITY IN USE (%)	FUNCTIONAL CAPACITY	PROPORTION OF FUNC. CAPACITY IN USE (%)	EXCEEDED <sup>2</sup>		
								FA	BEP	FUNC
Bearden Middle	1,121	146	-24	1,262	88.8	1,382	81.1	FA	B	0
Carter Middle	746	127	-43	890	83.8	922	80.9	FA	0	0
Cedar Bluff Middle	543	152	-18	656	82.7	732	74.1	FA	0	0
Farragut Middle	1,206	137	-33	1,257	95.9	1,333	90.5	FA	B	F2
Gresham Middle	733	154	-16	834	87.8	794	92.3	FA	B	F2
Halls Middle	1,018	138	-32	1,211	84.1	1,034	98.5	FA	0	F3
Holston Middle	728	192	22	885	82.2	749	97.1	0	0	F3
Karns Middle	1,121	148	-22	1,201	93.4	1,306	85.8	FA	B	F1
Northwest Middle	817	184	14	1,053	77.6	1,055	77.4	0	0	0
Powell Middle	911	83	-87	941	96.8	912	99.9	FA	B	F3
South-Doyle Middle	967	212	42	1,318	73.4	1,328	72.8	0	0	0
Vine Middle	393	285	115	865	45.4	858	45.8	0	0	0
West Valley Middle	1,112	169	-1	1,206	92.2	1,366	81.4	FA	B	0
Whittle Springs Middle	534	138	-32	743	71.9	683	78.2	FA	0	0
<b>Total</b>	<b>11,949</b>	<b>156</b>	<b>-14</b>	<b>14,322</b>	<b>83.4</b>	<b>14,454</b>	<b>82.7</b>	<b>FA</b>	<b>0</b>	<b>0</b>

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>Standards: FA = floor area capacity (standard = 170 square feet per student); BEP = Basic Education Program capacity (threshold = 85 percent of total); FUNC = functional capacity (threshold = 85 percent of total).

School is marked FA for floor area standard exceeded, B for BEP threshold exceeded, F1 for 85.0-89.9 percent functional capacity exceeded, F2 for 90.0-94.9 percent exceeded, F3 for 95.0 percent or more functional capacity exceeded.

Compiled by the Knoxville/Knox County Metropolitan Planning Commission using Knox County Schools and Public Building Authority data.

**TABLE 8  
MIDDLE SCHOOL CAPACITY AND PROJECTED (5-YEAR) ENROLLMENT COMPARISONS**

SCHOOL	PROJ. ENROL. 2011/12	FLOOR AREA PER STUDENT (SQ. FT.) <sup>1</sup>	FLOOR AREA PER STUDENT SHORTAGE/ SURPLUS (SQ. FT.)	BEP CAPACITY	PROPORTION OF BEP CAPACITY IN USE (%)	FUNCTIONAL CAPACITY	PROPORTION OF FUNC. CAPACITY IN USE (%)	EXCEEDED <sup>2</sup>		
								FA	BEP	FUNC
Bearden Middle	1,026	159	-11	1,262	81.3	1,382	74.3	FA	0	0
Carter Middle	740	128	-42	890	83.1	922	80.2	FA	0	0
Cedar Bluff Middle	412	200	30	656	62.8	732	56.2	0	0	0
Farragut Middle	1,461	113	-57	1,257	116.3	1,333	109.6	FA	B	F3
Gresham Middle	722	156	-14	834	86.6	794	90.9	FA	B	F2
Halls Middle	1,041	134	-36	1,211	86.0	1,034	100.7	FA	B	F3
Holston Middle	792	177	7	885	89.5	749	105.8	0	B	F3
Karns Middle	1,369	121	-49	1,201	114.0	1,306	104.9	FA	B	F3
Northwest Middle	881	170	0	1,053	83.7	1,055	83.5	0	0	0
Powell Middle	778	97	-73	941	82.7	912	85.3	FA	0	F1
South-Doyle Middle	1,078	190	20	1,318	81.8	1,328	81.2	0	0	0
Vine Middle	368	304	134	865	42.6	858	42.9	0	0	0
West Valley Middle	1,106	170	0	1,206	91.7	1,366	81.0	FA	B	0
Whittle Springs Middle	542	136	-34	743	73.0	683	79.4	FA	0	0
<b>Total</b>	<b>12,318</b>	<b>152</b>	<b>-18</b>	<b>14,322</b>	<b>86.0</b>	<b>14,454</b>	<b>85.2</b>	<b>FA</b>	<b>B</b>	<b>F1</b>

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>Standards: FA = floor area capacity (standard = 170 square feet per student); BEP = Basic Education Program capacity (threshold = 85 percent of total); FUNC = functional capacity (threshold = 85 percent of total).

School is marked FA for floor area standard exceeded, B for BEP threshold exceeded, F1 for 85.0-89.9 percent functional capacity exceeded, F2 for 90.0-94.9 percent exceeded, F3 for 95.0 percent or more functional capacity exceeded.

Compiled by the Knoxville/Knox County Metropolitan Planning Commission using Knox County Schools and Public Building Authority data.

**TABLE 9  
IMPACTS OF FUTURE BUILDING COMPLETIONS ON SCHOOL SYSTEM CAPACITIES: MIDDLE SCHOOLS**

<b>Analysis</b>	<b>Enrollment</b>	<b>Floor Area<sup>1</sup></b>	<b>Floor Area Per Student</b>	<b>BEP Capacity</b>	<b>BEP Capacity In Use (%)</b>	<b>Functional Capacity</b>	<b>Functional Capacity In Use (%)</b>
<b>Systemwide</b>							
Current	11,949	1,868,844	156	14,322	83.4	14,454	82.7
Forthcoming Additions <sup>2</sup>							
Holston		61,000		450		450	
Powell <sup>3</sup>		100,000		300		300	
By 2011/12 <sup>4</sup>	12,318	2,029,844	165	15,072	81.7	15,204	81.0
By 2016/17	12,754	2,029,844	159	15,072	84.6	15,204	83.9
<b>Holston</b>							
Current	728	139,885	192	885	82.3	749	97.2
Forthcoming Addition		61,000		450		450	
By 2011/12	792	200,885	254	1,335	59.3	1,199	66.1
By 2016/17	831	200,885	242	1,335	62.2	1,199	69.3
<b>Powell</b>							
Current	911	75,800	83	941	96.8	912	99.9
Forthcoming Addition		100,000		300		300	
By 2011/12	778	175,800	226	1,241	62.7	1,212	64.2
By 2016/17	813	175,800	216	1,241	65.5	1,212	67.1

Notes:

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>For the purposes of this analysis, it is assumed that the capacity added by building programs at Holston and Powell will fully accommodate BEP and functional requirements.

<sup>3</sup>Final design figures for the Powell Middle School addition have not yet been released. The 100,000-square feet total is an estimate based on preliminary information provided by Knox County Schools.

<sup>4</sup>Enrollment projections based on Moderate Growth Scenario developed by PEFA, October, 2006.

### 3. Elementary Schools

**a. Current conditions:** The systemwide inventory of 50 elementary schools currently operates at 87.3 percent of total BEP capacity, with 33 schools at or above the 85 percent threshold (Table 10). Enrollments occupy 86.1 percent of total functional capacity, with 22 schools over the 85 percent mark. Fifteen facilities are more than 90 percent full, five of which are over 100 percent occupied. If the 85 percent threshold is to be maintained, the elementary school system must find additional room for 664 students under BEP

guidelines, and 329 students under functional capacity definitions.

**b. Future conditions:** There are efforts underway to add space to the elementary system. A 125,000-square foot Cedar Bluff Elementary School is under construction and will replace the 105,520 square feet currently held in the primary and intermediate buildings (Tables 11 and 12). Capacity of the new school, however, will be smaller than the combined total of the two existing facilities. No plans have been announced for use of the existing buildings once the new school is open. Also under construction is a new Gibbs Elementary

School, a 124,000-square foot building that will replace the 39,000-square foot structure that currently serves the area. With this replacement, there will be a net gain of 300 in functional capacity, for a total of 1,000 seats at Gibbs.

Even with the current construction projects, there will be elementary school capacity shortages by 2011/12. Systemwide BEP capacity will be 28,472, but 25,513 students are projected, resulting in a 1,312-seat shortfall if an 85 percent threshold is preferred. Functional capacity is expected to total 28,827, which will represent a shortage of 1,010 spaces.

**TABLE 10  
ELEMENTARY SCHOOL CAPACITY AND CURRENT AVERAGE DAILY MEMBERSHIP (ADM) COMPARISONS**

SCHOOL	ADM 2006/07	FLOOR AREA PER STUDENT (SQ. FT.) <sup>1</sup>	FLOOR AREA PER STUDENT SHORTAGE/ SURPLUS (SQ. FT.)	BEP CAPACITY	PROPORTION OF BEP CAPACITY IN USE (%)	FUNCTIONAL CAPACITY	PROPORTION OF FUNC. CAPACITY IN USE (%)	EXCEEDED <sup>2</sup>		
								FA	BEP	FUNC
A. L. Lotts Elementary	1,102	97	-53	1,101	100.1	1,101	100.1	FA	B	F3
Adrian Burnett Elementary	611	99	-51	676	90.3	676	90.3	FA	B	F2
Amherst Elementary	623	236	86	864	72.1	864	72.1	0	0	0
Ball Camp Elementary	409	80	-70	440	92.9	520	78.6	FA	B	0
Bearden Elementary	310	140	-10	327	94.7	407	76.1	FA	B	0
Beaumont Elementary	426	169	19	502	84.8	452	94.2	0	0	F2
Belle Morris Elementary	450	115	-35	481	93.6	433	104.0	FA	B	F3
Blue Grass Elementary	745	104	-46	818	91.0	918	81.1	FA	B	0
Bonny Kate Elementary	393	97	-53	440	89.3	455	86.4	FA	B	F1
Brickey-McCloud Elementary	954	138	-12	880	108.4	960	99.3	FA	B	F3
Carter Elementary	474	74	-76	501	94.7	561	84.5	FA	B	0
Cedar Bluff Intermediate	568	84	-66	650	87.4	650	87.4	FA	B	F1
Cedar Bluff Primary	554	104	-46	636	87.0	656	84.4	FA	B	0
Chilhowee Intermediate	251	256	106	306	82.1	346	72.6	0	0	0
Christenberry Elementary	510	186	36	780	65.4	624	81.7	0	0	0
Copper Ridge Elementary	592	108	-42	665	89.0	715	82.8	FA	B	0
Corryton Elementary	216	71	-79	260	82.9	281	76.7	FA	0	0
Dogwood Elementary	660	190	40	1,340	49.2	792	83.3	0	0	0
East Knox Elementary	488	160	10	542	90.1	630	77.5	0	B	0
Farragut Intermediate	1,006	94	-56	991	101.5	991	101.5	FA	B	F3
Farragut Primary	964	111	-39	902	106.8	883	109.1	FA	B	F3
Fountain City Elementary	406	117	-33	477	85.0	499	81.3	FA	B	0
Gap Creek Elementary	111	168	18	153	72.7	173	64.3	0	0	0
Gibbs Elementary	650	61	-89	685	94.8	705	92.1	FA	B	F2
Green Elementary	320	203	53	495	64.7	412	77.7	0	0	0
Halls Elementary	751	114	-36	750	100.1	810	92.7	FA	B	F2
Hardin Valley Elementary	798	171	21	750	106.3	830	96.1	0	B	F3
Inskip Elementary	401	160	10	573	70.0	529	75.8	0	0	0

**TABLE 10 (continued)  
ELEMENTARY SCHOOL CAPACITY AND CURRENT AVERAGE DAILY MEMBERSHIP (ADM) COMPARISONS**

SCHOOL	ADM 2006/07	FLOOR AREA PER STUDENT (SQ. FT.) <sup>1</sup>	FLOOR AREA PER STUDENT SHORTAGE/ SURPLUS (SQ. FT.)	BEP CAPACITY	PROPORTION OF BEP CAPACITY IN USE (%)	FUNCTIONAL CAPACITY	PROPORTION OF FUNC. CAPACITY IN USE (%)	EXCEEDED <sup>2</sup>		
								FA	BEP	FUNC
Karns Elementary	1,060	171	21	1,170	90.6	1,170	90.6	0	B	F2
Lonsdale Elementary	168	344	194	330	50.8	189	88.7	0	0	F1
Maynard Elementary	173	210	60	194	89.2	170	101.8	0	B	F3
Mooreland Heights Elementary	262	130	-20	348	75.2	331	79.0	FA	0	0
Mount Olive Elementary	272	133	-17	320	85.0	360	75.5	FA	B	0
New Hopewell Elementary	279	109	-41	300	92.8	320	87.0	FA	B	F1
Norwood Elementary	476	95	-55	470	101.2	530	89.7	FA	B	F1
Pleasant Ridge Elementary	320	121	-29	444	72.2	485	66.1	FA	0	0
Pond Gap Elementary	328	93	-57	369	88.8	332	98.8	FA	B	F3
Powell Elementary	842	107	-43	869	96.9	1,029	81.9	FA	B	0
Ritta Elementary	444	158	8	430	103.2	590	75.2	0	B	0
Rocky Hill Elementary	688	106	-44	750	91.7	770	89.3	FA	B	F1
Sarah Moore Greene Elementary	546	229	79	825	66.1	743	73.4	0	0	0
Sequoyah Elementary	409	155	5	420	97.3	465	87.8	0	B	F1
Shannondale Elementary	393	82	-68	385	102.0	405	96.9	FA	B	F3
South Knoxville Elementary	130	284	134	174	74.7	184	70.6	0	0	0
Spring Hill Elementary	534	78	-72	593	90.0	593	90.0	FA	B	F2
Sterchi Elementary	355	109	-41	430	82.5	450	78.8	FA	0	0
Sunnyview Primary	286	142	-8	260	110.0	380	75.3	FA	B	0
West Haven Elementary	259	123	-27	307	84.2	387	66.8	FA	0	0
West Hills Elementary	694	123	-27	810	85.7	830	83.6	FA	B	0
West View Elementary	188	178	28	260	72.5	252	74.8	0	0	0
<b>Total</b>	<b>24,841</b>	<b>131</b>	<b>-19</b>	<b>28,443</b>	<b>87.3</b>	<b>28,838</b>	<b>86.1</b>	<b>FA</b>	<b>B</b>	<b>F1</b>

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>Standards: FA = floor area capacity (standard = 150 square feet per student); BEP = Basic Education Program capacity (threshold = 85 percent of total); FUNC = functional capacity (threshold = 85 percent of total).

School is marked FA for floor area standard exceeded, B for BEP threshold exceeded, F1 for 85.0-89.9 percent functional capacity exceeded, F2 for 90.0-94.9 percent exceeded, F3 for 95.0 percent or more functional capacity exceeded.

Compiled by the Knoxville/Knox County Metropolitan Planning Commission using Knox County Schools and Public Building Authority data.

**TABLE 11  
ELEMENTARY SCHOOL CAPACITY AND PROJECTED (5-YEAR) ENROLLMENT COMPARISONS**

SCHOOL	PROJ. ENROL. 2011/12	FLOOR AREA PER STUDENT (SQ. FT.) <sup>1</sup>	FLOOR AREA PER STUDENT SHORTAGE/ SURPLUS (SQ. FT.)	BEP CAPACITY	PROPORTION OF BEP CAPACITY IN USE (%)	FUNCTIONAL CAPACITY	PROPORTION OF FUNC. CAPACITY IN USE (%)	EXCEEDED <sup>2</sup>		
								FA	BEP	FUNC
								A. L. Lotts Elementary	1,224	87
Adrian Burnett Elementary	572	106	-44	676	84.6	676	84.6	FA	0	0
Amherst Elementary	751	196	46	864	86.9	864	86.9	0	B	F1
Ball Camp Elementary	462	71	-79	440	105.0	520	88.8	FA	B	F1
Bearden Elementary	409	106	-44	327	125.0	407	100.4	FA	B	F3
Beaumont Elementary	225	321	171	502	44.8	452	49.7	0	0	0
Belle Morris Elementary	455	113	-37	481	94.6	433	105.1	FA	B	F3
Blue Grass Elementary	706	109	-41	818	86.3	918	76.9	FA	B	0
Bonny Kate Elementary	429	89	-61	440	97.5	455	94.3	FA	B	F2
Brickey-McCloud Elementary	930	142	-8	880	105.7	960	96.9	FA	B	F3
Carter Elementary	490	71	-79	501	97.8	561	87.3	FA	B	F1
Cedar Bluff Intermediate	548	87	-63	650	84.3	650	84.3	FA	0	0
Cedar Bluff Primary	615	94	-56	636	96.7	656	93.8	FA	B	F2
Chilhowee Intermediate	323	199	49	306	105.6	346	93.4	0	B	F2
Christenberry Elementary	642	148	-2	780	82.3	624	102.8	FA	0	F3
Copper Ridge Elementary	708	90	-60	665	106.4	715	99.0	FA	B	F3
Corryton Elementary	248	62	-88	260	95.5	281	88.4	FA	B	F1
Dogwood Elementary	554	226	76	1,340	41.4	792	70.0	0	0	0
East Knox Elementary	515	152	2	542	95.0	630	81.7	0	B	0
Farragut Intermediate	1,257	76	-74	991	126.8	991	126.8	FA	B	F3
Farragut Primary	931	115	-35	902	103.2	883	105.4	FA	B	F3
Fountain City Elementary	352	135	-15	477	73.7	499	70.4	FA	0	0
Gap Creek Elementary	127	147	-3	153	83.0	173	73.4	FA	0	0
Gibbs Elementary	685	58	-92	685	100.1	705	97.2	FA	B	F3
Green Elementary	297	218	68	495	60.0	412	72.1	0	0	0
Halls Elementary	829	103	-47	750	110.5	810	102.3	FA	B	F3
Hardin Valley Elementary	886	154	4	750	118.2	830	106.8	0	B	F3
Inskip Elementary	300	214	64	573	52.3	529	56.7	0	0	0

**TABLE 11 (continued)  
ELEMENTARY SCHOOL CAPACITY AND PROJECTED (5-YEAR) ENROLLMENT COMPARISONS**

SCHOOL	PROJ. ENROL. 2011/12	FLOOR AREA PER STUDENT (SQ. FT.) <sup>1</sup>	FLOOR AREA PER STUDENT SHORTAGE/ SURPLUS (SQ. FT.)	BEP CAPACITY	PROPORTION OF BEP CAPACITY IN USE (%)	FUNCTIONAL CAPACITY	PROPORTION OF FUNC. CAPACITY IN USE (%)	EXCEEDED <sup>2</sup>		
								FA	BEP	FUNC
Karns Elementary	1,154	157	7	1,170	98.6	1,170	98.6	0	B	F3
Lonsdale Elementary	259	223	73	330	78.5	189	137.1	0	0	F3
Maynard Elementary	167	218	68	194	85.8	170	98.0	0	B	F3
Mooreland Heights Elementary	240	142	-8	348	68.9	331	72.4	FA	0	0
Mount Olive Elementary	293	124	-26	320	91.5	360	81.3	FA	B	0
New Hopewell Elementary	298	102	-48	300	99.2	320	93.0	FA	B	F2
Norwood Elementary	446	101	-49	470	94.8	530	84.1	FA	B	0
Pleasant Ridge Elementary	333	116	-34	444	75.0	485	68.6	FA	0	0
Pond Gap Elementary	246	124	-26	369	66.7	332	74.1	FA	0	0
Powell Elementary	774	116	-34	869	89.1	1,029	75.2	FA	B	0
Ritta Elementary	414	169	19	430	96.2	590	70.1	0	B	0
Rocky Hill Elementary	659	110	-40	750	87.8	770	85.5	FA	B	F1
Sarah Moore Greene Elementary	443	282	132	825	53.7	743	59.7	0	0	0
Sequoyah Elementary	356	178	28	420	84.7	465	76.5	0	0	0
Shannondale Elementary	378	85	-65	385	98.1	405	93.3	FA	B	F2
South Knoxville Elementary	138	267	117	174	79.4	184	75.1	0	0	0
Spring Hill Elementary	510	82	-68	593	85.9	593	85.9	FA	B	F1
Sterchi Elementary	430	90	-60	430	99.9	450	95.5	FA	B	F3
Sunnyview Primary	302	135	-15	260	116.2	380	79.5	FA	B	0
West Haven Elementary	307	103	-47	307	100.1	387	79.4	FA	B	0
West Hills Elementary	705	121	-29	810	87.1	830	85.0	FA	B	F1
West View Elementary	195	172	22	260	74.9	252	77.3	0	0	0
<b>Total</b>	<b>25,513</b>	<b>128</b>	<b>-22</b>	<b>28,443</b>	<b>89.7</b>	<b>28,838</b>	<b>88.5</b>	<b>FA</b>	<b>B</b>	<b>F1</b>

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>Standards: FA = floor area capacity (standard = 150 square feet per student); BEP = Basic Education Program capacity (threshold = 85 percent of total); FUNC = functional capacity (threshold = 85 percent of total).

School is marked FA for floor area standard exceeded, B for BEP threshold exceeded, F1 for 85.0-89.9 percent functional capacity exceeded, F2 for 90.0-94.9 percent exceeded, F3 for 95.0 percent or more functional capacity exceeded.

Compiled by the Knoxville/Knox County Metropolitan Planning Commission using Knox County Schools and Public Building Authority data.

**TABLE 12  
IMPACTS OF FUTURE BUILDING COMPLETIONS ON SCHOOL SYSTEM CAPACITIES: ELEMENTARY SCHOOLS**

<b>Analysis</b>	<b>Enrollment</b>	<b>Floor Area<sup>1</sup></b>	<b>Floor Area Per Student</b>	<b>BEP Capacity</b>	<b>BEP Capacity In Use (%)</b>	<b>Functional Capacity</b>	<b>Functional Capacity In Use (%)</b>
<b>Systemwide</b>							
Current	24,841	3,253,997	131	28,443	87.3	28,838	86.1
Forthcoming Projects							
Cedar Bluff <sup>2</sup>		19,480		-286		-306	
Gibbs <sup>3</sup>		84,573		315		295	
By 2011/12 <sup>4</sup>	25,513	3,358,050	132	28,472	89.6	28,827	88.5
By 2016/17	27,323	3,358,050	123	28,472	96.0	28,827	94.8
<b>Cedar Bluff</b>							
Current (Primary and Intermediate)	1,122	105,520	94	1,286	87.2	1,306	85.9
Forthcoming Project		125,000		1,000		1,000	
By 2011/12	1,163	125,000	107	1,000	116.3	1,000	116.3
By 2016/17	1,239	125,000	101	1,000	123.9	1,000	123.9
<b>Gibbs</b>							
Current	650	39,427	61	685	94.9	705	92.2
Forthcoming Project		124,000		1,000		1,000	
By 2011/12	685	124,000	181	1,000	68.5	1,000	68.5
By 2016/17	731	124,000	170	1,000	73.1	1,000	73.1

Notes:

<sup>1</sup>Excludes temporary classroom space in portable buildings.

<sup>2</sup>Cedar Bluff Elementary will be a 125,000-square foot facility to replace the current 105,520-square foot primary and intermediate buildings, for a net increase of 19,480 square feet. The new elementary school will accommodate 1,000 students, while the two existing facilities had a functional capacity total of 1,306. No decision has been made yet on future use of the old facility space upon completion of the new school.

<sup>3</sup>Gibbs Elementary will be a new, 124,000-square foot facility replacing the original 39,427-square foot building, for a net increase of 84,573 square feet. The new school will accommodate 1,000 students, while the old facility held 705, for a net functional capacity increase of 295 students.

<sup>4</sup>Enrollment projections based on Moderate Growth Scenario developed by PEFA, October, 2006.

### III. RESOLVING THE CONFLICTS BETWEEN GROWTH AND SERVICE PROVISION

#### A. Introduction

Knox County experienced considerable population growth in the past 15 years, resulting in uneven distribution of population and school enrolment increases in three of 12 county sectors. Several public elementary, middle, and high schools have been pushed beyond acceptable capacity limits, and traditional solutions have been offered to alleviate growth pressures: temporary classrooms, facility expansions, and new facility proposals and construction. The public education system is constrained fiscally and must seek other means to accommodate the demands of a growing population.

Knox County's school board members and county commissioners have begun to exert pressure on MPC planners and the development community to find ways to relieve the strains on area schools. In a May 2005 resolution, the Knox County Board of Education asked MPC to evaluate each new residential subdivision application to determine if property tax revenues generated by development would offset costs associated with added demands on schools. The board also requested that MPC re-write its regulations governing the approval of subdivisions, requiring assessment of impacts on the school system (Appendix C). Knox County Commission followed with a September 2005 resolution calling for MPC to annually prepare a report on residential growth trends for the school board (Appendix C). (It should be noted that this type of reporting

has been provided to KCS staff for several years, and during the past three years, a new, highly detailed study, *Development Activity in Knox County: Residential Growth in Public School Zones*, was prepared for KCS and automated for reporting on demand.)

#### B. Growth Management Overview

Knox County is not alone in its struggle to balance the demands of growth and the provision of adequate public education facilities and services. Planners across the country have been developing growth management tools, innovative mechanisms that operate along two paths: seek new funding sources beyond traditional means like sales or property taxes, which cannot keep pace with service and infrastructure demands, and, control the pace of growth so communities can add services at a rate that does not strain limited natural and economic resources.

Growth management principles are comprised of techniques and tools developed over many years within planning practice, designed to achieve several major goals (Porter, 1997):

- Preservation of natural resources and environmental amenities.
- Maintenance of desirable quality of life.
- Improvement of economic opportunities and social equity.
- Guidance of community development.
- Management of location and character of community expansion.
- Efficient provision of community infrastructure.

The last two goals are particularly pertinent to this report:

#### 1. Location and Character of Community Expansion

The location and character of expansion are primarily managed by a community's zoning ordinance, subdivision regulations, and comprehensive plan, which specify where, when, how much, and what kind of development can occur. Supplementing these traditional measures, communities can manage growth using any number of additional techniques:

**a. Urban growth boundaries:** Growth is confined to a pre-determined area around the existing urban portions of a community and prevented from spreading to surrounding countryside that the community wishes to preserve. Growth boundaries are drawn to include enough land to accommodate about 20 years of projected development, with periodic adjustments based on development trends. Urban growth boundaries encourage compact development, preserve open space and rural resources, and promote efficient use and extension of community infrastructure and services.

**b. Development policy areas:** Similar to urban growth boundaries, development policy areas steer new investment to clearly delineated sections of a community. Three land designations are made: *urban area* is comprised of established neighborhoods and centers; *urbanizing areas* are the portions where most new development will occur; and, *urban reserves* are open spaces preserved until some future period.

**c. Infill and redevelopment areas:** Infill and redevelopment policies direct new investment to areas of existing development in which vacant or underused properties are found. As a result, dilapidated residential neighborhoods and commercial/industrial cores are revitalized. Financial incentives such as land subsidies, tax exemptions, infrastructure improvements, and other community-funded assistance encourage infill and re-investment.

**d. Growth limits:** Community ordinances that limit the number of building permit approvals, pace the delivery of infrastructure improvements, or impose moratoria on new development altogether are examples of growth limiting devices.

## **2. Provision of Infrastructure**

Controlled timing of new service and infrastructure delivery is an important growth management technique to supplement a community's comprehensive plan and capital improvement program in the face of growth pressures, especially when trying to meet tight funding requirements:

**a. Functional plans:** A functional plan supplements the public infrastructure component of a comprehensive plan. The functional plan evaluates existing conditions and promotes standards for roads, utilities, schools, parks, and other community facilities. Plans for each of these elements should include projections of future needs and a list of priorities for the location and timing of improvements.

**b. Adequate public facility requirements:** Under this form of regulation, developers must demonstrate that existing community

infrastructure has sufficient capacity to serve the population added by new subdivisions and building activity. Where facility limits have been reached, projects will be deferred or denied until publicly-funded improvements occur, as scheduled in the community's capital improvements program, or they can proceed if developers are willing to build or finance necessary infrastructure upgrades.

**c. Exactions, fees, and special districts:** Funds are collected from developers and those residents that directly benefit from infrastructure improvements related to new development, rather than passing costs along to the entire community.

**d. Project rating systems:** Development proposals are evaluated for acceptability based on adopted standards. Ratings incorporate factors such as the availability of adequate public facilities, among other criteria, to help decision makers assess the suitability of a project and its potential impact on community.

## **C. Growth Tools to Address School Needs**

The growth management tools profiled to this point represent generalized options to address pressures on limited community resources. Examples of regulatory and fiscal measures that address the impacts of growth specifically on school infrastructure are presented here:

### **1. Regulatory Mechanisms**

Several communities across the country have adopted growth management techniques centered on land use controls and development regulations to balance growth demands and school service

provision. Many approaches fall under the heading of *adequate public facilities ordinances*, as introduced above: regulations coordinating the timing of land development and the provision of community infrastructure.

**a. School capacity standards in adopted plans and regulations:** In Florida, Alachua County and the City of Gainesville adopted *school capacity standards* in their comprehensive plans and land development regulations. Development proposals may be evaluated for immediate impact on school capacity in accordance with defined level of service (LOS) standards. Application and enforcement of these standards is a difficult undertaking, however, and planners in Gainesville and Alachua County have faced considerable opposition from the local development community when they attempt to render decisions based on growth's impacts on school capacity.

Officials in Blount County, Tennessee recently adopted an amendment to local subdivision regulations that require adequate school capacity to be in place before new subdivisions can be approved. County planners and school board members worked together to define appropriate school capacity standards and to identify school zones in which overcrowding had rendered conditions *intolerable*. Under the new regulations, a subdivision proposal of five or more lots in an *intolerable* zone would not be approved unless one or more conditions was met: a change in the status of the zone was forthcoming; the requested number of lots was reduced; or, proof could be offered that the project would not generate a substantial number of school

children. Officials recognize that continued denial of plats is not a viable long-term response to inadequate school infrastructure; rather capital budgeting for schools should continue in a reasonable manner and be evaluated with respect to other fiscal priorities. The City of Maryville, also in Blount County, is close to approving similar subdivision regulation amendments.

**b. School impact analysis:** In Baltimore County, Maryland developers are required to submit a *school impact analysis* with their proposals. Estimated impacts on school facilities are measured against the Board of Education's continually updated enrollments, pupil yield tables, capacities, and school zone boundaries. If it is determined that a development will cause overcrowding or will occur in an area already experiencing overcrowding, the county planning office will report those findings in its recommendation to approve or deny the application.

**c. School capacity certificates:** Several communities in North Carolina, including Chapel Hill, Orange County, Cary, and Wake County, have been evaluating ordinances to control the pace of growth in areas of school overcrowding. Under consideration is a proposed requirement that developers obtain *certificates* from school administrators verifying sufficient facility capacity to accommodate additional students in areas of new home construction, based on adopted standards of student population generation rates per household by housing unit type. Where school capacity is insufficient, projects could be delayed until new facility construction occurs.

**d. Housing allocations:** In response to a rate of population growth that equated to a need for one new school per year, officials in Charles County, Maryland implemented growth limits through a program of *housing allocations*. Set by the county every six months, housing allocations are tied to enrollment and capacity in six high school attendance districts. Development proposals may receive county approval, however, building permits are withheld until allocations become available through enrollment changes or new school construction.

**e. Adequate public facilities testing:** The Department of Planning and Zoning in Howard County, Maryland requires *adequate public facilities testing* during the review of all residential subdivision proposals. Testing is conducted for elementary and middle school capacity, as well as for road intersections and housing unit allocations. If public facilities are adversely impacted by development, such that capacity is reached or exceeded, the proposal is placed on hold until a change in status of the strained facility is realized. Proposals are reviewed by a subdivision evaluation committee comprised of county and state officials representing planning, health, recreation, emergency services, highways, soil conservation, and education departments.

**f. School concurrency:** School capacity certificate programs, housing allocations, and adequate public facilities testing are closely related to a growth management measure more generally known as *school concurrency*. Concurrency requirements state that school capacity must be available to accommodate any new school age

population resulting from a development proposal, at the time development is to occur. If capacity is not readily available, the proposal is denied or postponed until adequate facilities can be provided by the local government, the developer, or some negotiated partnership between the two. Concurrency requirements have been adopted in Palm Beach County, Florida, and several other communities in the state are considering them, encouraged by state-enabled growth management legislation dealing specifically with education service provision.

## 2. Funding Mechanisms

Where sales and property taxes are not adequate to finance new public services and infrastructure necessitated by growth pressures, alternative funding mechanisms provide options to communities. Bonds, grants, and loans are commonly tapped revenue sources, but more innovative methods have been devised, several of which have been authorized in Tennessee: special assessment districts (such as road improvement districts or special school districts, which allow authorized communities to levy additional property taxes to finance infrastructure improvements), tax increment financing districts (areas in which tax revenue growth is earmarked for particular projects), certificates of participation, investments, and growth levies (Green, Gros, and Roehrich-Patrick, 2002).

Growth levies are revenue-generating mechanisms that attempt to assign much of the financial burden of growth to the populations that ultimately benefit most from the new services demanded, rather than

distribute costs across an entire community. Two types of growth levies permitted by state law in Tennessee are *adequate facilities/development taxes* and *impact fees*.

**a. Adequate facilities/development**

**taxes:** In Tennessee, *development taxes* (also known as *adequate facilities* or *construction taxes*) are imposed on the building industry (residential, commercial, and industrial) to generate revenue for local government general funds. Development taxes supplement, not replace, sales and property taxes. The taxes are usually levied on all new development on a uniform basis. While revenues do not have to be earmarked for specific uses, they are typically restricted to expenditures associated with new growth, including school construction, road improvements, and other public infrastructure (Green and Eldridge, 2004; Green and Young, 2002).

**b. Impact fees:** Impact fees are one time charges imposed by a local government on the developers of a construction project. Officials must demonstrate a need for new services or infrastructure directly resulting from the development. By Tennessee law, impact fees must be reasonably related to

the actual costs of providing additional community services. A standard formula and pre-set fee schedule provide the basis for fee calculation, and the amount of the fee cannot exceed a proportional fair share of the cost of serving the project area. Fees are assessed per building lot or unit, and levels are based on the type of development and infrastructure impacted. Fee revenues are usually kept separate from a local government's general fund and earmarked for financing infrastructure improvements in the growth areas (Green and Eldridge, 2004; Green and Young, 2002).

According to the Tennessee Advisory Commission on Intergovernmental Relations (TACIR), impact fees differ from adequate facilities taxes in several ways:

- Adequate facilities taxes/development taxes are used to raise revenue and do not have to be earmarked for specific projects. They are deposited in a community's general fund.
- Impact fees are used to finance facilities for specific developments.
- Adequate facilities taxes can be used for pre-existing deficiencies or operations/maintenance projects.

- Tax fee schedules do not have to be based on documented burdens and benefits.
- Tax levels are set by the local governing body, while impact fees must be based on standard usage formulas.
- The determination of maximum justifiable impact fees is very complex, requiring detailed empirical data and the use of nationwide service standards.
- Taxes are simpler to enact, administer, and keep current.
- Development taxes typically are not subject to legal challenge.

(Green, Chervin, and Lippard, 2002)

The first impact fees and adequate facilities taxes in Tennessee were authorized in 1987 in Williamson County and the cities of Brentwood, Fairview, and Franklin. As of mid-2004, 14 counties and 84 cities in Tennessee have been authorized to exact development taxes or impact fees (Green and Eldridge, 2004). To date, all 14 counties, but only 15 of the cities, had passed ordinances to implement their development taxes/impact fees (Tables 13 and 14).

**TABLE 13  
TENNESSEE COUNTIES AND MUNICIPALITIES WITH DEVELOPMENT TAXES OR IMPACT FEES (2004)**

AREA	TYPE
Cheatham County	Adequate facilities tax, development tax
Ashland City	Adequate facilities tax
Kingston Springs	Adequate facilities tax
Pegram	Adequate facilities tax
Davidson County	Impact fee
Dickson County	Adequate facilities tax
Fayette County	Adequate facilities tax
Piperton	Adequate facilities tax
Hickman County	Development privilege tax
Macon County	Adequate facilities tax, impact fees
Marshall County	Adequate facilities tax
Maury County	Adequate facilities tax
Columbia	Impact fee
Spring Hill	Adequate facilities tax, construction impact fee
Montgomery County	Adequate facilities tax
Robertson County	Adequate facilities tax
White House	Impact fee
Rutherford County	Adequate facilities tax, development tax
La Vergne	Impact fee
Smyrna	Development tax
Gatlinburg (Sevier County)	Construction impact fee, development impact fee
Sumner County	Adequate facilities tax
Trousdale County	Adequate facilities tax
Williamson County	Adequate (school) facilities tax, construction impact fee
Brentwood	Adequate facilities tax, construction privilege tax, construction impact fee
Fairview	Adequate facilities tax, construction impact fee
Franklin	Adequate facilities tax, construction impact fee
Nolensville	Adequate facilities tax
Mount Juliet (Wilson County)	Residential construction impact fee

Sources: Green and Eldridge, 2004; Green and Young, 2002.

**TABLE 14  
EXAMPLES OF IMPACT FEES AND ADEQUATE FACILITIES/DEVELOPMENT TAXES IN SELECTED TENNESSEE LOCATIONS (2001)**

PLACE	TYPE OF FEE	APPLICABILITY	RATES	DISTRIBUTION OF REVENUES
Cheatham County	Development tax	Single- and multi-family residential development	\$3,750 per lot or unit	\$3,125 to schools, \$250 to parks, \$375 to general fund
Cheatham County	Adequate facilities tax	New residential development	Max. \$1.00 per gross sq. ft.	Education debt service
Marshall County	Adequate facilities tax	New residential and commercial development	Max. \$2.00 per gross sq. ft.	Capital projects fund
Spring Hill (Maury County)	Construction impact fee	Residential and commercial development	\$500 plus \$0.25 per gross sq. ft.	Public facilities related to new development
White House (Robertson County)	Impact fee	Any development	Average \$1,245 per residential unit, commercial levies vary	Specific costs related to new development
La Vergne (Rutherford County)	Impact fee	Any development	\$450 per unit single-family, \$311 per unit multi-family, commercial levies vary	Specific road and park costs related to new development
Smyrna (Rutherford County)	Development tax	All property subject to taxation	\$1,232 per unit single-family, \$813 per unit multi-family, \$847 per mobile home, commercial levies vary	Unspecified
Williamson County	Construction impact fee	New land development	\$0.90 per sq. ft. per residential unit in unincorporated areas, \$0.68 per sq. ft. in cities, \$0.34 per sq. ft. commercial	\$0.60 to schools, \$0.20 to roads, \$0.08 to parks, \$0.02 to fire protection
Brentwood (Williamson County)	Construction impact fee	New land development	\$598 per residential unit, commercial levies vary	Capital improvements fund
Brentwood (Williamson County)	Adequate facilities tax	New residential and non-residential development	Max. \$1.00 per gross sq. ft. residential, max. \$2.00 per gross sq. ft. non-residential	Public facilities related to new development

Source: Green and Young, 2002.

### 3. Growth Management Implementation Challenges

Growth management mechanisms, such as impact fees, development taxes, and measures imbedded within comprehensive plans and ordinances, have worked with varying degrees of success across the country. Implementation challenges are common, however, and appear in a number of ways:

**a. Political disfavor:** In making decisions on development proposals, planners often

find it difficult to garner political support to uphold the provisions of growth controls, especially when elected officials are confronted with vocal opposition. Growth controls can be very unpopular, and to reduce conflict and stress, management measures require investment in research, justification, standard setting, and political lobbying, and, therefore, should not be approached lightly.

**b. Defensible standards:** Definitions behind school concurrency measures, level

of service (LOS) requirements, impact fees, and other management devices require thoroughly researched, evaluated, and defensible standards. Where standards are legally ambiguous, look for controls to fail.

**c. Shortsighted responses:** Planners, educators, and legislators must find a way to balance demands for new development and the provision of adequate school services. Suspending investment in areas with strained community facilities is not a viable long-term solution.

**d. Lack of coordination:** A balance between growth and service provision cannot be achieved if community planners attend only to land development while educators plan only for schools. Interagency coordination is essential.

**e. Outdated management tools:**

Outdated growth controls fail to meet modern school system needs:

- Magnet programs and the *No Child Left Behind Act* make school transfers a common occurrence, blurring geographic attendance zones and redefining neighborhood schools.
- Public charter schools are growing in number. They operate under approval from state government, receiving the same per student revenues as other public schools, but they are run by community groups, for-profit organizations, cultural or educational institutions, or other operators. Curriculum and facility location are chosen by the groups running the schools, raising issues with siting, traffic, and other services otherwise handled within the larger community planning function of local government.
- School shopping (families moving from one attendance zone to another in search of better quality schools) occurs in many communities, challenging planners and educators to monitor changing neighborhood demographics and predict future enrollments.
- Growing demand for co-located community facilities is contributing to changes to the concept of school

campus. Many communities are looking at campus designs that allow service as public schools during the day and community colleges in the evening, while grounds serve as public parks and recreation facilities, and libraries are shared neighborhood outlets. Multi-use community facilities necessitate a reinvention of location criteria for public schools.

***D. Does Knox County's Growth Justify the Adoption of Formal Development Controls?***

As a result of steady and unevenly distributed population growth in Knox County in recent years, many public schools have reached or exceeded facility capacity. However, is local growth, and its resultant strains on public infrastructure, comparable to that in other communities across the country where development has occurred at such high rates that growth management measures have been adopted?

To help answer this question, recent growth in Knox County was compared to growth in 34 communities in Florida, Maine, Maryland, New Hampshire, North Carolina, and Tennessee where devices, such as impact fees, adequate facilities taxes, and concurrency requirements, have been implemented.

**1. General Population**

Between 1980 and 2000, total population growth in Knox County reached 62,000 (a nearly 20 percent increase), much of which occurred in the 1990s when a 14 percent increase was recorded (Table 15). In comparison to the 34 growth control communities, Knox County's net increase

earned a ranking of 20<sup>th</sup> (Table 16). Its rate of change, however, sent it down the list to 30<sup>th</sup> place. Communities in Florida outpaced most others, with population increases ranging from 26.5 percent in Pinellas County to 115 percent in Lee County. As noted earlier, Florida is among the nation's leaders in growth management legislation, particularly in school infrastructure planning, driven by the state's phenomenal growth rates. When compared to the 14 selected Tennessee counties with growth management policies in place, Knox led all but three in net growth.

**2. Population Under 20 Years of Age**

Persons aged 0 to 19 years represent the school age population cohort of a community. During the 1980s, Knox County's school cohort shrunk, consistent with trends observed across the country (Table 17). The national rate of decline was 1.7 percent, while Knox County's was a more sizeable 7.4 percent. A noticeable turnaround in many places occurred in the 1990s, however, as growth rates soared. In Knox County, the 20-year growth trend showed a 3,400 person increase, a 3.6 percent change, the net result of 12 percent growth in the 1990s and decline in the decade prior. In comparison to the growth control communities, Knox was at the bottom of the list for school age population change, ranking 33<sup>rd</sup> out of 34 (Table 18). Knoxville's moderate growth numbers mask an impressive statistic, however. More than 10,000 students were added to local public and private schools in the 1990s. The addition of more than 1,000 students per year was comparable to creating demand for nearly one full school per year. Coming on the heels of a decade of decline, though, excess capacity was available in the system

to accommodate most of the growth. With each new year, however, that capacity has dwindled, and pressure on the system has steadily increased.

### 3. Public School Enrollment

Some of the strain of accommodating nearly 1,000 additional students each year in Knox

County during the 1990s was eased by private schools and homeschooling. Knox County public schools added about 7,500 students during the 1990s, or 750 per year throughout the decade (Table 19). In terms of rate of change, the sizeable decline in the 1980s offset the increase in the 1990s, resulting in a 20-year decline of 5.3 percent.

Accordingly, Knox County was at the bottom of the ranks for net and percentage growth when compared to the selected growth control communities (Table 20). However, if the growth of the 1990s is considered separately, Knox County's increase of 7,549 public school students earned a 5<sup>th</sup> place ranking in Tennessee.

**TABLE 15  
TOTAL POPULATION, 1980-2000**

AREA	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
<b>KNOX COUNTY, TN</b>	<b>319,694</b>	<b>335,749</b>	<b>382,032</b>	<b>16,055</b>	<b>46,283</b>	<b>62,338</b>	<b>5.0</b>	<b>13.8</b>	<b>19.5</b>
FLORIDA	9,841,159	12,937,926	15,982,378	3,096,767	3,044,452	6,141,219	31.5	23.5	62.4
Broward	1,018,257	1,255,488	1,623,018	237,231	367,530	604,761	23.3	29.3	59.4
Miami-Dade	1,625,509	1,937,094	2,253,362	311,585	316,268	627,853	19.2	16.3	38.6
Duval	571,003	672,971	778,879	101,968	105,908	207,876	17.9	15.7	36.4
Lee	205,266	335,113	440,888	129,847	105,775	235,622	63.3	31.6	114.8
Manatee	148,445	211,707	264,002	63,262	52,295	115,557	42.6	24.7	77.8
Orange	470,867	677,491	896,344	206,624	218,853	425,477	43.9	32.3	90.4
Palm Beach	576,754	863,518	1,131,184	286,764	267,666	554,430	49.7	31.0	96.1
Pasco	193,661	281,131	344,765	87,470	63,634	151,104	45.2	22.6	78.0
Pinellas	728,531	851,659	921,482	123,128	69,823	192,951	16.9	8.2	26.5
Polk	321,652	405,382	483,924	83,730	78,542	162,272	26.0	19.4	50.4
Sarasota	202,251	277,776	325,957	75,525	48,181	123,706	37.3	17.3	61.2
MAINE	1,127,825	1,227,928	1,274,923	100,103	46,995	147,098	8.9	3.8	13.0
MARYLAND	4,226,191	4,781,468	5,296,486	555,277	515,018	1,070,295	13.1	10.8	25.3
Baltimore	655,615	692,134	754,292	36,519	62,158	98,677	5.6	9.0	15.1
Cecil	60,430	71,347	85,951	10,917	14,604	25,521	18.1	20.5	42.2
Charles	72,751	101,154	120,546	28,403	19,392	47,795	39.0	19.2	65.7
Harford	145,930	182,132	218,590	36,202	36,458	72,660	24.8	20.0	49.8
Howard	118,572	187,328	247,842	68,756	60,514	129,270	58.0	32.3	109.0
NEW HAMPSHIRE	924,802	1,109,252	1,235,786	184,450	126,534	310,984	19.9	11.4	33.6

**TABLE 15 (continued)**  
**TOTAL POPULATION, 1980-2000**

AREA	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
<b>KNOX COUNTY, TN</b>	<b>319,694</b>	<b>335,749</b>	<b>382,032</b>	<b>16,055</b>	<b>46,283</b>	<b>62,338</b>	<b>5.0</b>	<b>13.8</b>	<b>19.5</b>
NORTH CAROLINA	5,896,178	6,628,637	8,049,313	732,459	1,420,676	2,153,135	12.4	21.4	36.5
Mecklenburg	404,270	511,433	695,454	107,163	184,021	291,184	26.5	36.0	72.0
Orange	77,055	93,851	118,227	16,796	24,376	41,172	21.8	26.0	53.4
Wake	301,429	423,380	627,846	121,951	204,466	326,417	40.5	48.3	108.3
TENNESSEE	4,600,705	4,877,185	5,689,283	276,480	812,098	1,088,578	6.0	16.7	23.7
Cheatham	21,616	27,140	35,912	5,524	8,772	14,296	25.6	32.3	66.1
Davidson	477,811	510,784	569,891	32,973	59,107	92,080	6.9	11.6	19.3
Dickson	30,037	35,061	43,156	5,024	8,095	13,119	16.7	23.1	43.7
Fayette	25,305	25,559	28,806	254	3,247	3,501	1.0	12.7	13.8
Hickman	15,151	16,754	22,295	1,603	5,541	7,144	10.6	33.1	47.2
Macon	15,700	15,906	20,386	206	4,480	4,686	1.3	28.2	29.8
Marshall	19,698	21,539	26,767	1,841	5,228	7,069	9.3	24.3	35.9
Maury	51,095	54,812	69,498	3,717	14,686	18,403	7.3	26.8	36.0
Montgomery	83,342	100,498	134,768	17,156	34,270	51,426	20.6	34.1	61.7
Robertson	37,021	41,494	54,433	4,473	12,939	17,412	12.1	31.2	47.0
Rutherford	84,058	118,570	182,023	34,512	63,453	97,965	41.1	53.5	116.5
Sumner	85,790	103,281	130,449	17,491	27,168	44,659	20.4	26.3	52.1
Trousdale	6,137	5,920	7,259	-217	1,339	1,122	-3.5	22.6	18.3
Williamson	58,108	81,021	126,638	22,913	45,617	68,530	39.4	56.3	117.9
UNITED STATES	227,225,826	248,709,873	281,421,906	21,484,047	32,712,033	54,196,080	9.5	13.2	23.9

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

**TABLE 16**  
**TOTAL POPULATION, 1980-2000 (RANKED BY NET POPULATION CHANGE)**

COUNTY		CHANGE		CHANGE (%)	
		1980-2000	RANK	1980-2000	RANK
Miami-Dade	FL	627,853	1	38.6	24
Broward	FL	604,761	2	59.4	15
Palm Beach	FL	554,430	3	96.1	6
Orange	FL	425,477	4	90.4	7
Wake	NC	326,417	5	108.3	5
Mecklenburg	NC	291,184	6	72.0	10
Lee	FL	235,622	7	114.8	3
Duval	FL	207,876	8	36.4	25
Pinellas	FL	192,951	9	26.5	29
Polk	FL	162,272	10	50.4	18
Pasco	FL	151,104	11	78.0	8
Howard	MD	129,270	12	109.0	4
Sarasota	FL	123,706	13	61.2	14
Manatee	FL	115,557	14	77.8	9
Baltimore	MD	98,677	15	15.1	33
Rutherford	TN	97,965	16	116.5	2
Davidson	TN	92,080	17	19.3	31
Harford	MD	72,660	18	49.8	19
Williamson	TN	68,530	19	117.9	1
<b>KNOX</b>	<b>TN</b>	<b>62,338</b>	<b>20</b>	<b>19.5</b>	<b>30</b>
Montgomery	TN	51,426	21	61.7	13
Charles	MD	47,795	22	65.7	12
Sumner	TN	44,659	23	52.1	17
Orange	NC	41,172	24	53.4	16
Cecil	MD	25,521	25	42.2	23
Maury	TN	18,403	26	36.0	26
Robertson	TN	17,412	27	47.0	21
Cheatham	TN	14,296	28	66.1	11
Dickson	TN	13,119	29	43.7	22
Hickman	TN	7,144	30	47.2	20
Marshall	TN	7,069	31	35.9	27
Macon	TN	4,686	32	29.8	28
Fayette	TN	3,501	33	13.8	34
Trousdale	TN	1,122	34	18.3	32

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

**TABLE 17  
POPULATION UNDER 20 YEARS OF AGE, 1980-2000**

AREA	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
<b>KNOX COUNTY, TN</b>	<b>94,559</b>	<b>87,589</b>	<b>97,971</b>	<b>-6,970</b>	<b>10,382</b>	<b>3,412</b>	<b>-7.4</b>	<b>11.9</b>	<b>3.6</b>
FLORIDA	2,702,697	3,202,058	4,031,619	499,361	829,561	1,328,922	18.5	25.9	49.2
Broward	242,878	282,925	415,039	40,047	132,114	172,161	16.5	46.7	70.9
Miami-Dade	448,484	520,921	618,025	72,437	97,104	169,541	16.2	18.6	37.8
Duval	184,131	194,222	225,669	10,091	31,447	41,538	5.5	16.2	22.6
Lee	50,962	72,378	94,247	21,416	21,869	43,285	42.0	30.2	84.9
Manatee	35,117	44,746	59,445	9,629	14,699	24,328	27.4	32.8	69.3
Orange	147,954	185,089	252,178	37,135	67,089	104,224	25.1	36.2	70.4
Palm Beach	140,370	186,227	262,746	45,857	76,519	122,376	32.7	41.1	87.2
Pasco	40,906	55,709	76,106	14,803	20,397	35,200	36.2	36.6	86.1
Pinellas	157,885	168,926	194,092	11,041	25,166	36,207	7.0	14.9	22.9
Polk	99,358	108,737	129,966	9,379	21,229	30,608	9.4	19.5	30.8
Sarasota	40,490	48,572	57,944	8,082	9,372	17,454	20.0	19.3	43.1
MAINE	364,009	346,862	334,375	-17,147	-12,487	-29,634	-4.7	-3.6	-8.1
MARYLAND	1,323,858	1,295,811	1,488,378	-28,047	192,567	164,520	-2.1	14.9	12.4
Baltimore	182,488	168,485	197,613	-14,003	29,128	15,125	-7.7	17.3	8.3
Cecil	21,292	21,393	25,822	101	4,429	4,530	0.5	20.7	21.3
Charles	28,956	32,832	37,585	3,876	4,753	8,629	13.4	14.5	29.8
Harford	51,616	54,290	65,386	2,674	11,096	13,770	5.2	20.4	26.7
Howard	40,163	52,555	73,766	12,392	21,211	33,603	30.9	40.4	83.7
NEW HAMPSHIRE	294,578	313,256	342,956	18,678	29,700	48,378	6.3	9.5	16.4
NORTH CAROLINA	1,893,986	1,832,042	2,187,079	-61,944	355,037	293,093	-3.3	19.4	15.5
Mecklenburg	127,483	139,596	191,423	12,113	51,827	63,940	9.5	37.1	50.2
Orange	22,266	23,917	31,938	1,651	8,021	9,672	7.4	33.5	43.4
Wake	93,542	111,855	175,021	18,313	63,166	81,479	19.6	56.5	87.1

**TABLE 17 (continued)  
POPULATION UNDER 20 YEARS OF AGE, 1980-2000**

AREA	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
<b>KNOX COUNTY, TN</b>	<b>94,559</b>	<b>87,589</b>	<b>97,971</b>	<b>-6,970</b>	<b>10,382</b>	<b>3,412</b>	<b>-7.4</b>	<b>11.9</b>	<b>3.6</b>
TENNESSEE	1,473,484	1,375,532	1,556,134	-97,952	180,602	82,650	-6.6	13.1	5.6
Cheatham	7,696	8,325	10,675	629	2,350	2,979	8.2	28.2	38.7
Davidson	139,529	133,051	145,614	-6,478	12,563	6,085	-4.6	9.4	4.4
Dickson	10,052	10,575	12,544	523	1,969	2,492	5.2	18.6	24.8
Fayette	9,795	8,390	8,143	-1,405	-247	-1,652	-14.3	-2.9	-16.9
Hickman	4,753	4,483	6,061	-270	1,578	1,308	-5.7	35.2	27.5
Macon	4,922	4,481	5,857	-441	1,376	935	-9.0	30.7	19.0
Marshall	5,975	6,091	7,548	116	1,457	1,573	1.9	23.9	26.3
Maury	16,313	15,774	20,172	-539	4,398	3,859	-3.3	27.9	23.7
Montgomery	28,025	30,539	42,222	2,514	11,683	14,197	9.0	38.3	50.7
Robertson	12,420	12,488	16,109	68	3,621	3,689	0.5	29.0	29.7
Rutherford	28,144	36,604	54,614	8,460	18,010	26,470	30.1	49.2	94.1
Sumner	30,051	31,394	37,676	1,343	6,282	7,625	4.5	20.0	25.4
Trousdale	1,815	1,599	1,973	-216	374	158	-11.9	23.4	8.7
Williamson	20,107	25,496	39,965	5,389	14,469	19,858	26.8	56.8	98.8
UNITED STATES	72,401,079	71,196,050	80,184,287	-1,205,029	8,988,237	7,783,208	-1.7	12.6	10.8

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

**TABLE 18  
POPULATION UNDER 20 YEARS OF AGE, 1980-2000 (RANKED BY NET POPULATION CHANGE)**

COUNTY		CHANGE		CHANGE (%)	
		1980-2000	RANK	1980-2000	RANK
Broward	FL	172,161	1	70.9	8
Miami-Dade	FL	169,541	2	37.8	16
Palm Beach	FL	122,376	3	87.2	3
Orange	FL	104,224	4	70.4	9
Wake	NC	81,479	5	87.1	4
Mecklenburg	NC	63,940	6	50.2	12
Lee	FL	43,285	7	84.9	6
Duval	FL	41,538	8	22.6	27
Pinellas	FL	36,207	9	22.9	26
Pasco	FL	35,200	10	86.1	5
Howard	MD	33,603	11	83.7	7
Polk	FL	30,608	12	30.8	17
Rutherford	TN	26,470	13	94.1	2
Manatee	FL	24,328	14	69.3	10
Williamson	TN	19,858	15	98.8	1
Sarasota	FL	17,454	16	43.1	14
Baltimore	MD	15,125	17	8.3	31
Montgomery	TN	14,197	18	50.7	11
Harford	MD	13,770	19	26.7	21
Orange	NC	9,672	20	43.4	13
Charles	MD	8,629	21	29.8	18
Sumner	TN	7,625	22	25.4	23
Davidson	TN	6,085	23	4.4	32
Cecil	MD	4,530	24	21.3	28
Maury	TN	3,859	25	23.7	25
Robertson	TN	3,689	26	29.7	19
<b>KNOX</b>	<b>TN</b>	<b>3,412</b>	<b>27</b>	<b>3.6</b>	<b>33</b>
Cheatham	TN	2,979	28	38.7	15
Dickson	TN	2,492	29	24.8	24
Marshall	TN	1,573	30	26.3	22
Hickman	TN	1,308	31	27.5	20
Macon	TN	935	32	19.0	29
Trousdale	TN	158	33	8.7	30
Fayette	TN	-1,652	34	-16.9	34

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

**TABLE 19  
PUBLIC ELEMENTARY AND HIGH SCHOOL ENROLLMENT, 1980-2000**

AREA	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
<b>KNOX COUNTY, TN</b>	<b>57,168</b>	<b>46,610</b>	<b>54,159</b>	<b>-10,558</b>	<b>7,549</b>	<b>-3,009</b>	<b>-18.5</b>	<b>16.2</b>	<b>-5.3</b>
FLORIDA	1,571,197	1,701,042	2,455,479	129,845	754,437	884,282	8.3	44.4	56.3
Broward	140,003	146,453	252,979	6,450	106,526	112,976	4.6	72.7	80.7
Miami-Dade	245,600	281,730	388,728	36,130	106,998	143,128	14.7	38.0	58.3
Duval	104,002	97,684	129,512	-6,318	31,828	25,510	-6.1	32.6	24.5
Lee	30,009	38,909	55,924	8,900	17,015	25,915	29.7	43.7	86.4
Manatee	20,920	24,302	36,423	3,382	12,121	15,503	16.2	49.9	74.1
Orange	85,680	93,288	147,582	7,608	54,294	61,902	8.9	58.2	72.2
Palm Beach	73,748	93,415	158,234	19,667	64,819	84,486	26.7	69.4	114.6
Pasco	25,721	31,088	47,750	5,367	16,662	22,029	20.9	53.6	85.6
Pinellas	93,576	88,005	113,817	-5,571	25,812	20,241	-6.0	29.3	21.6
Polk	60,487	60,295	80,210	-192	19,915	19,723	-0.3	33.0	32.6
Sarasota	24,294	25,943	35,754	1,649	9,811	11,460	6.8	37.8	47.2
MAINE	232,141	195,856	217,956	-36,285	22,100	-14,185	-15.6	11.3	-6.1
MARYLAND	788,752	653,321	871,928	-135,431	218,607	83,176	-17.2	33.5	10.5
Baltimore	104,570	78,812	108,339	-25,758	29,527	3,769	-24.6	37.5	3.6
Cecil	13,305	11,858	15,749	-1,447	3,891	2,444	-10.9	32.8	18.4
Charles	18,069	17,058	22,517	-1,011	5,459	4,448	-5.6	32.0	24.6
Harford	32,559	28,028	39,638	-4,531	11,610	7,079	-13.9	41.4	21.7
Howard	25,494	27,369	45,312	1,875	17,943	19,818	7.4	65.6	77.7
NEW HAMPSHIRE	173,562	161,566	211,216	-11,996	49,650	37,654	-6.9	30.7	21.7
NORTH CAROLINA	1,182,045	1,030,459	1,329,319	-151,586	298,860	147,274	-12.8	29.0	12.5
Mecklenburg	76,503	71,209	107,316	-5,294	36,107	30,813	-6.9	50.7	40.3
Orange	11,018	10,322	16,039	-696	5,717	5,021	-6.3	55.4	45.6
Wake	55,702	58,758	100,922	3,056	42,164	45,220	5.5	71.8	81.2

**TABLE 19 (continued)**  
**PUBLIC ELEMENTARY AND HIGH SCHOOL ENROLLMENT, 1980-2000**

AREA	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
<b>KNOX COUNTY, TN</b>	<b>57,168</b>	<b>46,610</b>	<b>54,159</b>	<b>-10,558</b>	<b>7,549</b>	<b>-3,009</b>	<b>-18.5</b>	<b>16.2</b>	<b>-5.3</b>
TENNESSEE	880,774	762,103	934,587	-118,671	172,484	53,813	-13.5	22.6	6.1
Cheatham	4,924	4,731	6,778	-193	2,047	1,854	-3.9	43.3	37.7
Davidson	73,321	62,830	74,554	-10,491	11,724	1,233	-14.3	18.7	1.7
Dickson	6,695	6,246	8,018	-449	1,772	1,323	-6.7	28.4	19.8
Fayette	5,369	4,462	4,096	-907	-366	-1,273	-16.9	-8.2	-23.7
Hickman	3,154	2,644	3,753	-510	1,109	599	-16.2	41.9	19.0
Macon	3,127	2,757	3,842	-370	1,085	715	-11.8	39.4	22.9
Marshall	3,870	3,790	5,101	-80	1,311	1,231	-2.1	34.6	31.8
Maury	9,918	9,066	11,441	-852	2,375	1,523	-8.6	26.2	15.4
Montgomery	16,090	16,085	25,664	-5	9,579	9,574	0.0	59.6	59.5
Robertson	7,627	7,138	9,794	-489	2,656	2,167	-6.4	37.2	28.4
Rutherford	16,052	20,033	32,097	3,981	12,064	16,045	24.8	60.2	100.0
Sumner	19,064	18,159	23,112	-905	4,953	4,048	-4.7	27.3	21.2
Trousdale	1,193	983	1,303	-210	320	110	-17.6	32.6	9.2
Williamson	11,650	13,390	23,521	1,740	10,131	11,871	14.9	75.7	101.9
UNITED STATES	42,121,836	38,379,689	48,374,639	-3,742,147	9,994,950	6,252,803	-8.9	26.0	14.8

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

**TABLE 20  
PUBLIC ELEM. AND HIGH ENROLLMENT, 1980-2000 (RANKED BY NET CHANGE)**

COUNTY		CHANGE		CHANGE (%)	
		1980-2000	RANK	1980-2000	RANK
Miami-Dade	FL	143,128	1	58.3	12
Broward	FL	112,976	2	80.7	7
Palm Beach	FL	84,486	3	114.6	1
Orange	FL	61,902	4	72.2	10
Wake	NC	45,220	5	81.2	6
Mecklenburg	NC	30,813	6	40.3	15
Lee	FL	25,915	7	86.4	4
Duval	FL	25,510	8	24.5	21
Pasco	FL	22,029	9	85.6	5
Pinellas	FL	20,241	10	21.6	24
Howard	MD	19,818	11	77.7	8
Polk	FL	19,723	12	32.6	17
Rutherford	TN	16,045	13	100.0	3
Manatee	FL	15,503	14	74.1	9
Williamson	TN	11,871	15	101.9	2
Sarasota	FL	11,460	16	47.2	13
Montgomery	TN	9,574	17	59.5	11
Harford	MD	7,079	18	21.7	23
Orange	NC	5,021	19	45.6	14
Charles	MD	4,448	20	24.6	20
Sumner	TN	4,048	21	21.2	25
Baltimore	MD	3,769	22	3.6	31
Cecil	MD	2,444	23	18.4	28
Robertson	TN	2,167	24	28.4	19
Cheatham	TN	1,854	25	37.7	16
Maury	TN	1,523	26	15.4	29
Dickson	TN	1,323	27	19.8	26
Davidson	TN	1,233	28	1.7	32
Marshall	TN	1,231	29	31.8	18
Macon	TN	715	30	22.9	22
Hickman	TN	599	31	19.0	27
Trousdale	TN	110	32	9.2	30
Fayette	TN	-1,273	33	-23.7	34
<b>KNOX</b>	<b>TN</b>	<b>-3,009</b>	<b>34</b>	<b>-5.3</b>	<b>33</b>

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

#### **4. Mixed Findings**

Local population and enrollment trends show mixed results. When compared to communities with growth measures in place, Knox County falls toward the bottom of rankings for population change, indicating that pressures locally are not as intense as

those felt elsewhere. However, development in Knox has not been distributed evenly. Southwest, northwest, and north areas have seen rates of increase that rival those in many of the communities that have taken formal action to control the timing and direction of investment.

Lopsided population expansion has caused many local school zones to reach or exceed capacity, while stable and declining areas report a surplus of space. A closer look at options to address the impacts of growth in Knox County is offered in the next section.

## IV. OPTIONS TO TACKLE SCHOOL OVERCROWDING

### **A. Operational Approaches to Ease Overcrowding**

Several local schools, in older parts of the city and other areas that have seen little new residential investment, have excess capacity. Re-alignment of school attendance zones would take children out of overcrowded schools and redistribute them to zones with available facility space. However, there are costs involved: children must travel greater distances to school, requiring additional bus service; re-assignment of children from one school to another incurs administrative expense; and, the political price tag is enormous as rezoning causes a great deal of public consternation, families strongly resisting the physical and emotional upheaval. Costs aside, re-alignment of school zones to redistribute student population could be a temporary solution only. If local development trends continue in the same unbalanced pattern as seen over the past 15 to 20 years, redistricting would have to be repeated every few years.

Knox County Schools administration could consider an alternative operating calendar, offering year-round instruction with staggered start times of selected grades and courses over three semesters per year, rather than two. School system capacity would be increased through an administrative solution, rather than new construction. This option would require a major overhaul to the way local schools currently operate, a sizeable time and financial investment.

Other possible solutions to overcrowding problems involve changes to the Knox

County School system's staffing and physical plant inventory. At several schools in high growth areas in recent years, the addition of staff and portable classrooms and reconfiguration of space have relieved growth pressures. In areas of strongest growing pains though, facility expansion and new facility construction were undertaken. The fiscal costs involved in these types of options were substantial. For example, the new Hardin Valley High School under construction in northwest Knox County will total about \$50 million.

The above options to ease overcrowding are operational tools, controlled by the Knox County School Board and Knox County Commission, contingent on fiscal and political conditions. These alternatives can provide relief, but they are not without costs, some of which are prohibitive. Accordingly, there is a need to go beyond the operational choices and look at long-term planning solutions to growth pressures and resultant demands on public education services.

### **B. Long-Term Opportunities for a Better Planning Environment**

#### **1. Where does education planning enter into the land planning and evaluation process?**

**a. Comprehensive plan:** The *Knoxville/Knox County General Plan 2033* is the community's 30-year comprehensive, or master, plan prepared by the Metropolitan Planning Commission. The plan provides the framework for evaluation of zoning and subdivision proposals, among other

development requests. It identifies the need for adequate education facilities, citing the role schools play as cornerstones of neighborhoods and community. Several action statements and development policies address education infrastructure:

*i.* As stated in the plan's *Action Proposals: Sustainable Neighborhoods and Communities:* Coordinate capital improvements, including roads, utilities, schools, and parks, so that communities are ready for the impacts of growth.

*ii.* Further attention is paid under *Action Proposals: Infrastructure Coordination:* Greater coordination of planning and construction of community facilities and infrastructure is needed, including schools, libraries, other public buildings, roads, and utilities. The development community should be included in this process, so that they can advise and inform the other participants of the issues and opportunities related to schools and infrastructure, as well as potential trends in development.

*iii.* Among the proposed actions:

- Creation of a Capital Improvements Coordinating Committee to share information between the Knox County School Board, utility districts, the city, county, and state highway department.
- Compilation and maintenance of maps showing improvements anticipated by the local governments, school board, and utility districts. Combine these maps with development trend maps.
- Annual briefings or reports to the committee members on current and future development trends from MPC, the Home Builders' Association, and other land development experts.

*iv. The Development Policies* of the plan cover community growth and include school-related policies:

*4. Understand the Building Blocks: Neighborhoods, Districts, Corridors, and Communities in the Region:*

*4.1: Use schools and parks as foundations in planning neighborhoods and communities.*

*5. Make Strategic Community Investments:*

*5.1: Coordinate new utility services with development of roads, schools, employment*

centers, shopping areas, and recreation sites to encourage efficient development patterns and limit sprawl.

*5.3: Plan far in advance for land acquisition, financing, and design of neighborhood-serving community facilities: roads, schools, parks, utilities, and public buildings.*

*5.10: Locate new schools on relatively flat land central to the areas being served. Elementary schools should be located on collector roads, middle and high schools should be located on arterial roads.*

*5.11: Establish school-park complexes and acquire park land adjacent to future school sites.*

*5.12: Expand the use of schools for other community purposes.*

*5.13: Continue school reuse, renovation, and maintenance programs. Abandoned schools should be used for neighborhood serving public purposes.*

**b. Growth policy plan:** In 1999, the Knox County Growth Policy Coordinating Committee developed a land management plan that complies with *Tennessee Public Chapter 1101*, the state's annexation and growth management law. The *Growth*

*Policy Plan*, adopted in 2000 by the City of Knoxville, Town of Farragut, and Knox County, designates three local growth categories, or boundaries: rural, planned growth, and urban growth. Each has clearly defined development guidelines and restrictions, designated to accomplish several goals. Those addressing the provision of adequate public services, such as schools, include:

*i. Encourage a pattern of compact and contiguous development to be guided into urban areas and planned growth areas.*

*ii. Establish an acceptable and consistent level of public services and community facilities and ensure timely provision of those services and facilities.*

*iii. Take into consideration such other matters that may be logically related to or form an integral part of a plan for the coordinated, efficient, and orderly development of the local community.*

**c. Zoning ordinances:** The subject of education facilities is addressed at two different levels within local zoning ordinances. First, siting requirements for schools as a form of new development are defined. Second, the impact of other forms of development on school infrastructure is discussed.

Within the zoning ordinances adopted by Knoxville and Knox County is language pertaining to the permissible land use categories for siting school facilities. In unincorporated portions of Knox County, the *Zoning Ordinance for Knox County, Tennessee* allows the placement of schools as a use by right, allowable in most zones. School siting is more restricted within city limits, though. The *Zoning Ordinance for Knoxville, Tennessee* allows schools in many of the city's residential zones, typically as a use on review (that is, requiring MPC evaluation prior to approval), but most other zoning categories in the city prohibit school facilities.

The potential impacts of residential rezonings on community infrastructure (particularly roads, drainage, and schools) are routinely estimated by MPC planners when reviewing large-scale projects. For schools, planners look at student generation rates based on average school-age population per household. That said, there is no formal requirement in the ordinances that planners specifically assess the impacts of a new development proposal on school facilities and their capacities. That type of evaluation is undertaken at the discretion of MPC staff.

**d. Subdivision regulations:** New subdivisions in Knox County must meet standards defined in *Knoxville/Knox County Minimum Subdivision Regulations*. Attention has been paid specifically to education infrastructure, but no language has been adopted pertaining to the assessment of growth's impacts on schools. Text relevant to schools is found in *Section 6: Design Standards, Subsection 68: Public Open Spaces*: "For the purpose of

providing for adequate public land, the Planning Commission may require the dedication or reservation of usable open space within a subdivision up to a total of ten percent of the gross area or water frontage of the subdivision for park, school, or recreation purposes."

**e. School board representation in planning functions:** KCS representatives are invited to attend monthly subdivision review meetings with MPC staff. They also are welcome to participate in monthly zoning reviews, however, these arrangements are informal.

**f. Additional cooperative efforts:** The zoning and subdivision review processes could benefit from more rigorous guidelines, greater collaboration between planners and educators, and stronger support for planning recommendations by elected officials. The environment for collaborative planning between MPC and KCS is improving though. For the past three years, MPC staff members have worked closely with KCS and, recently, with the Public Building Authority to formalize a planning assistance program. The three agencies have combined resources and expertise to form a Partnership for Education Facilities Assessment (PEFA). The group will work together to develop and deliver several products and services:

- Provision of data on approved subdivision lots and building permits to KCS.
- Preparation of an annual development trends analysis.
- Generation of a countywide inventory of sites suitable for new schools.

- Generation of school-by-school and systemwide enrollment projections, updated regularly.
- Other planning assistance as needed, on request.

## **2. How can the development review process be improved to address infrastructure needs, without stifling a strong, growth-oriented economy?**

Presented is a toolkit of planning options to coordinate local development planning and school facility planning. (A few of the practices have been adopted in Florida where a new generation of school planning initiatives is underway. A summary is provided in Appendix D.)

**a. Interlocal agreements:** School board staff members participate in local land use decisions and serve on technical committees. Local planners and government officials participate in the school board's long-range planning and facility location activities.

**b. Joint use agreements:** Evaluate the role of school facilities as community assets serving multiple functions: meeting places, parks, recreation centers, libraries, and other shared uses.

**c. School impact analysis during review of development proposals:** Collaborate with school officials on proposal recommendations and routinely share development data (anticipated number of building units, additional population, school enrollments, facility capacities, enrollment projections, development projections).

**d. School facilities element in the comprehensive plan, establishing the goals and requirements of school siting.**

**e. School site dedication by developers of large-scale residential projects that will add significant numbers of school age population.**

**f. School impact fees.**

### **3. Final Comments**

The Metropolitan Planning Commission currently accommodates several of the options listed above: MPC operates within an informal version of an *interlocal agreement* by inviting school board staff to zoning and subdivision review meetings and through a planning assistance program with Knox County Schools and the Public Building Authority. MPC supports local *joint*

*use* arrangements. Though not adopted in a legally-binding *agreement*, multiple uses of existing and proposed community facilities are recommended in Knox County's twelve sector plans and the comprehensive plan. The county's comprehensive plan, growth policy plan, and zoning ordinances recommend several actions pertaining to school service and siting. Finally, local subdivision regulations provide for site dedication from developers of large-scale projects. Planners can ask for land to be set aside for community use, but support of elected officials is necessary to complete the process.

Political support is an issue that weaves through many of the planning options: local growth management tools, such as the growth policy plan, zoning ordinances, subdivision regulations, and comprehensive plan, allow planners and educators to

advocate policies and actions that could improve the conditions under which land development and community service provision occur, however, the support of elected officials on Knox County Commission, Knoxville City Council, and the Knox County School Board must follow. Informal arrangements between planners and school administrators can be replaced with legally-adopted interlocal agreements, joint use agreements, and other growth management measures, but only with the backing of the community's elected decision-makers. It is, therefore, the job of local planners and educators to inform officials of school facility siting and capacity issues, and to help them better understand how development activity, land use and facility planning, and capital improvement programming interact to affect current and future school needs.

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## APPENDICES

### APPENDIX A: KNOX COUNTY DEMOGRAPHICS

#### I. POPULATION TRENDS, 1980-2000

##### A. All Population

- During the 1980s, Knox County's population grew by 16,000. Between 1990 and 2000, it expanded by approximately 46,000 persons. Another 22,940 were added in the past five years, bringing the county's total to 404,972 in 2005. For the past 10 years, Knox County's average population growth rate was one percent per year.
- During the 1980s, seven of Knox County's 12 planning sectors (Figure A1) witnessed population decline (Table A1). In the 1990s, only the Central and East City Sectors recorded losses, while all

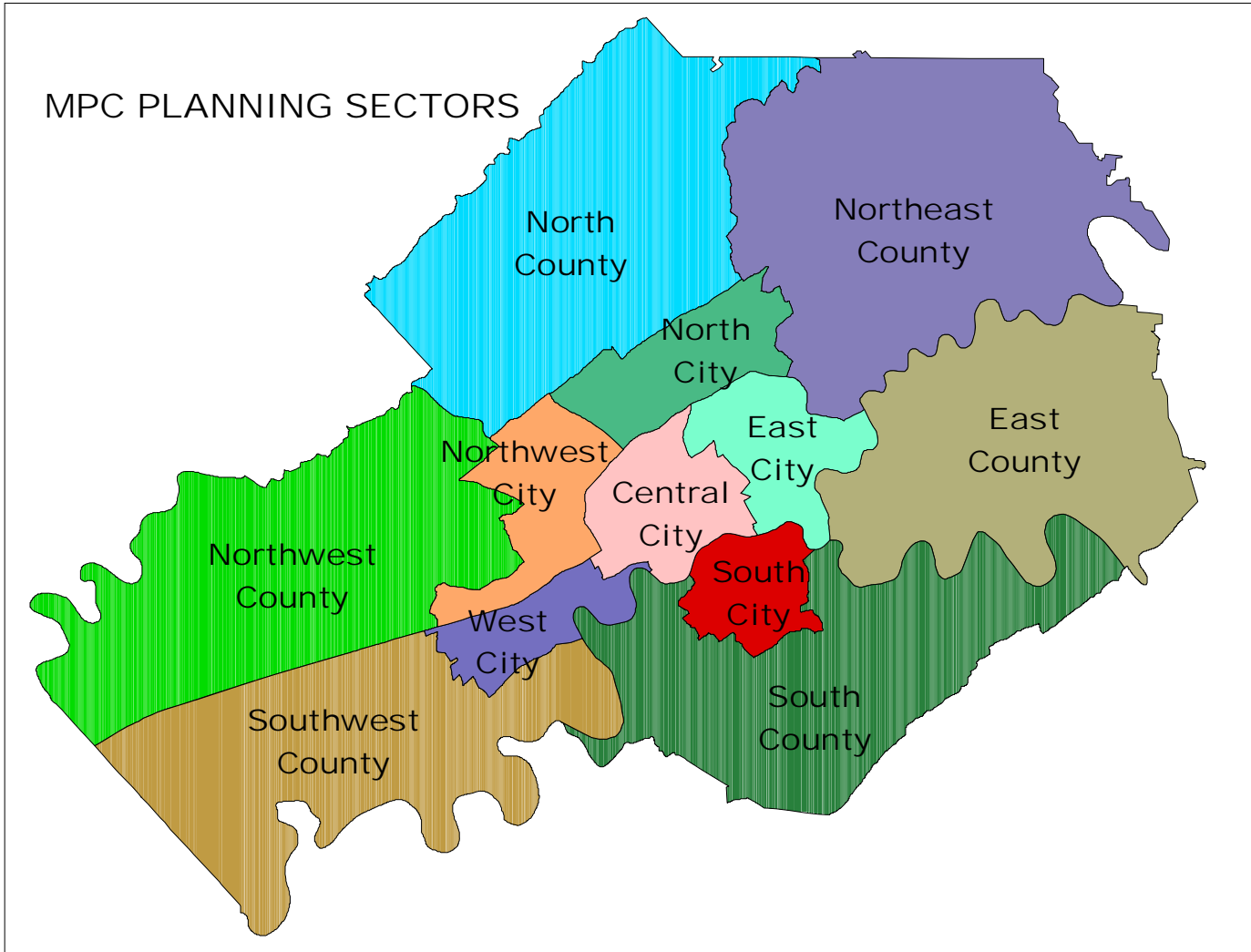
others saw moderate to rapid growth. (Note: Post-2000 Census data are reported only at the Knox County and City of Knoxville scales. Population counts for smaller geographic areas, such as sectors, will not be available until 2010.)

- Looking back over 20 years (1980 to 2000), four city sectors netted population declines: Central, East, South, and West City Sectors. None of the county sectors reported population loss during the same period.
- Between 1980 and 2000, the Southwest, Northwest, and North County Sectors captured the greatest amounts of growth (Figure

A2). Investment was particularly robust during the 1990s for the Northwest and Southwest Sectors. As a result, by 2000, they overtook the Central City Sector in total areawide population, holding 17 percent and 15 percent shares respectively (Figure A3). The Central City clung to a 13 percent share.

- Combined, the North, Northwest, and Southwest County Sectors accounted for more than 40 percent of the area's total population in 2000. By comparison, East, Northeast, and South County Sectors held only a 14 percent share.

FIGURE A1



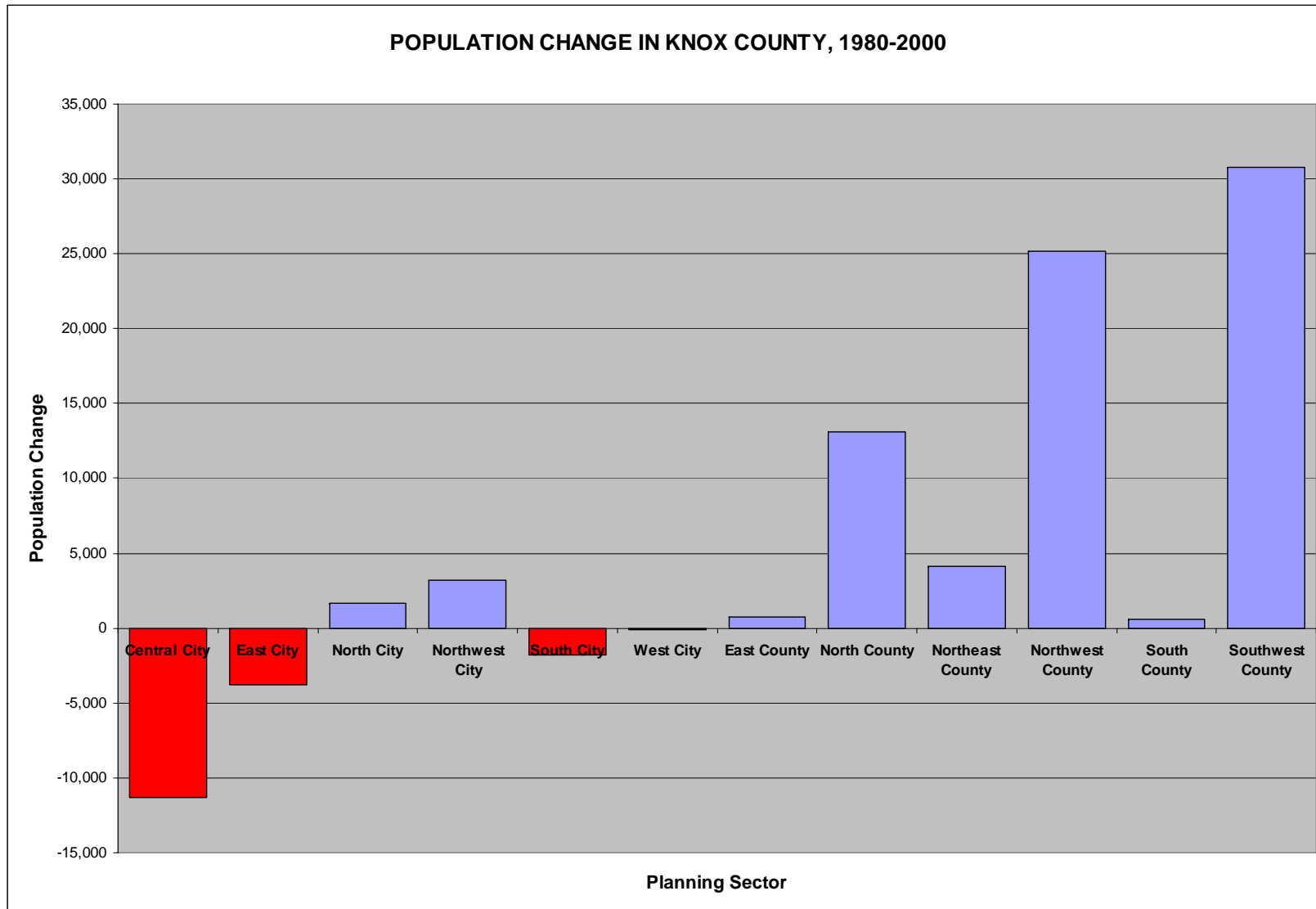
**TABLE A1  
TOTAL POPULATION, 1980-2000**

SECTOR	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
Central City	59,606	52,888	48,260	-6,718	-4,628	-11,346	-11.3	-8.8	-19.0
East City	29,324	25,933	25,528	-3,391	-405	-3,796	-11.6	-1.6	-12.9
North City	23,649	23,527	25,343	-122	1,816	1,694	-0.5	7.7	7.2
Northwest City	24,759	25,202	27,974	443	2,772	3,215	1.8	11.0	13.0
South City	20,286	17,595	18,470	-2,691	875	-1,816	-13.3	5.0	-9.0
West City	20,334	19,901	20,248	-433	347	-86	-2.1	1.7	-0.4
East County	12,579	12,357	13,313	-222	956	734	-1.8	7.7	5.8
North County	29,450	32,391	42,557	2,941	10,166	13,107	10.0	31.4	44.5
Northeast County	17,716	18,982	21,816	1,266	2,834	4,100	7.1	14.9	23.1
Northwest County	37,684	49,404	62,864	11,720	13,460	25,180	31.1	27.2	66.8
South County	18,684	17,734	19,240	-950	1,506	556	-5.1	8.5	3.0
Southwest County	25,623	39,835	56,419	14,212	16,584	30,796	55.5	41.6	120.2
All Sectors	319,694	335,749	382,032	16,055	46,283	62,338	5.0	13.8	19.5

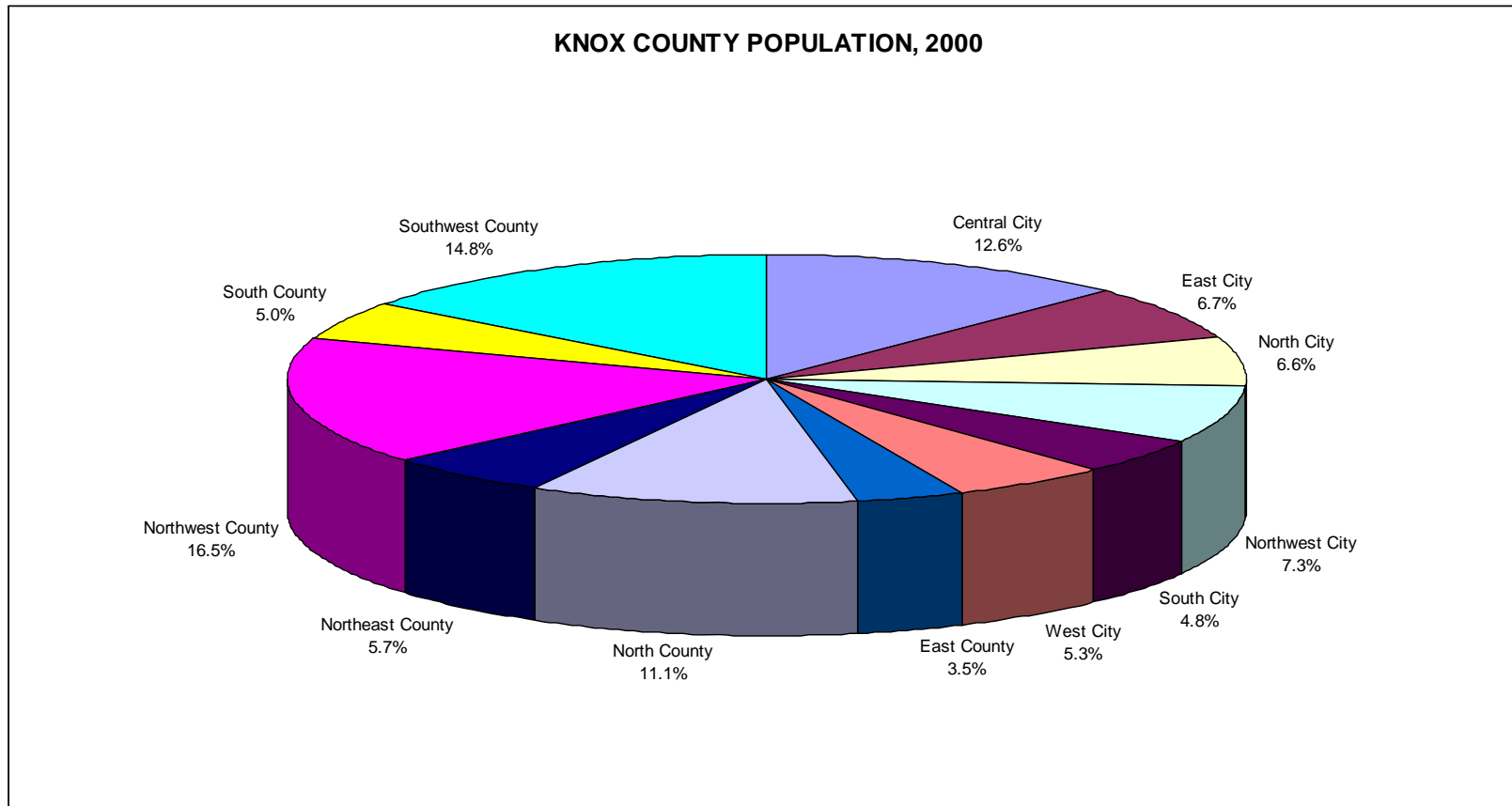
Note: Census data for years after the 2000 decennial census are available only at the Knox County and City of Knoxville geographic scales and cannot be disaggregated to MPC's planning sectors.

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

**FIGURE A2**



**FIGURE A3**



**B. School Age Population**

- Child population (persons under 20 years of age) in Knox County grew 3.6 percent between 1980 and 2000, far off the pace of nearly 20 percent for the population as a whole (Table A2).
- Between 1980 and 2000, eight of Knox County's 12 planning sectors experienced decline in child population (Figure A4). Losses were seen in all city sectors and two county sectors. The Northeast County Sector was nearly unchanged, while the North, Northwest, and Southwest County

Sectors accounted for almost 100 percent of the growth.

- During the 1980s, all areas except the Northwest and Southwest County Sectors experienced decline in child population. The 1990s saw a trend reversal, with all but three sectors reporting gains. Where growth occurred, it was modest (10.0 percent or less), except in the North, Northwest, and Southwest, where rates were 21 percent or higher.
- The child population in the Southwest County Sector almost doubled between 1980 and 2000,

growing from 8,600 to nearly 17,000.

- Consistent with overall population patterns, the North, Northwest, and Southwest County Sectors held more than 45 percent of the child population countywide, while the other three county sectors, East, Northeast, and South, accounted for a 13 percent share (Figure A5). City sectors combined for the remaining 41 percent, led by the Central City's 15 percent.

**TABLE A2  
POPULATION UNDER 20 YEARS OF AGE, 1980-2000**

SECTOR	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
Central City	18,069	15,193	14,515	-2,876	-678	-3,554	-15.9	-4.5	-19.7
East City	7,585	6,196	6,093	-1,389	-103	-1,492	-18.3	-1.7	-19.7
North City	5,843	5,182	5,460	-661	278	-383	-11.3	5.4	-6.6
Northwest City	6,726	5,639	5,978	-1,087	339	-748	-16.2	6.0	-11.1
South City	5,689	4,282	4,336	-1,407	54	-1,353	-24.7	1.3	-23.8
West City	4,483	4,018	3,976	-465	-42	-507	-10.4	-1.0	-11.3
East County	3,972	3,207	3,280	-765	73	-692	-19.3	2.3	-17.4
North County	9,941	9,061	11,527	-880	2,466	1,586	-8.9	27.2	16.0
Northeast County	5,395	4,935	5,418	-460	483	23	-8.5	9.8	0.4
Northwest County	12,565	13,634	16,462	1,069	2,828	3,897	8.5	20.7	31.0
South County	5,724	4,409	4,422	-1,315	13	-1,302	-23.0	0.3	-22.7
Southwest County	8,567	11,833	16,504	3,266	4,671	7,937	38.1	39.5	92.6
All Sectors	94,559	87,589	97,971	-6,970	10,382	3,412	-7.4	11.9	3.6

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

**FIGURE A4**

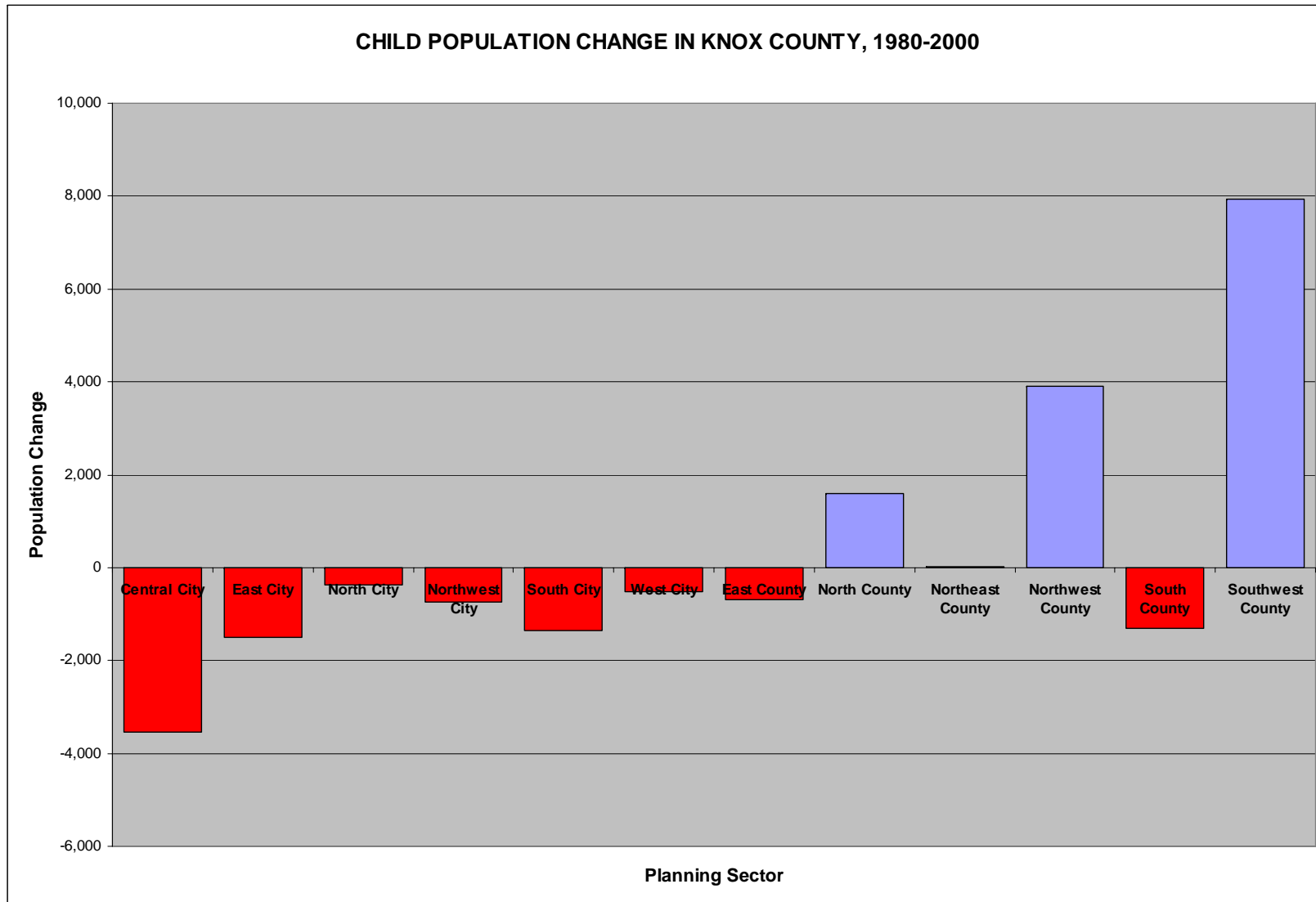
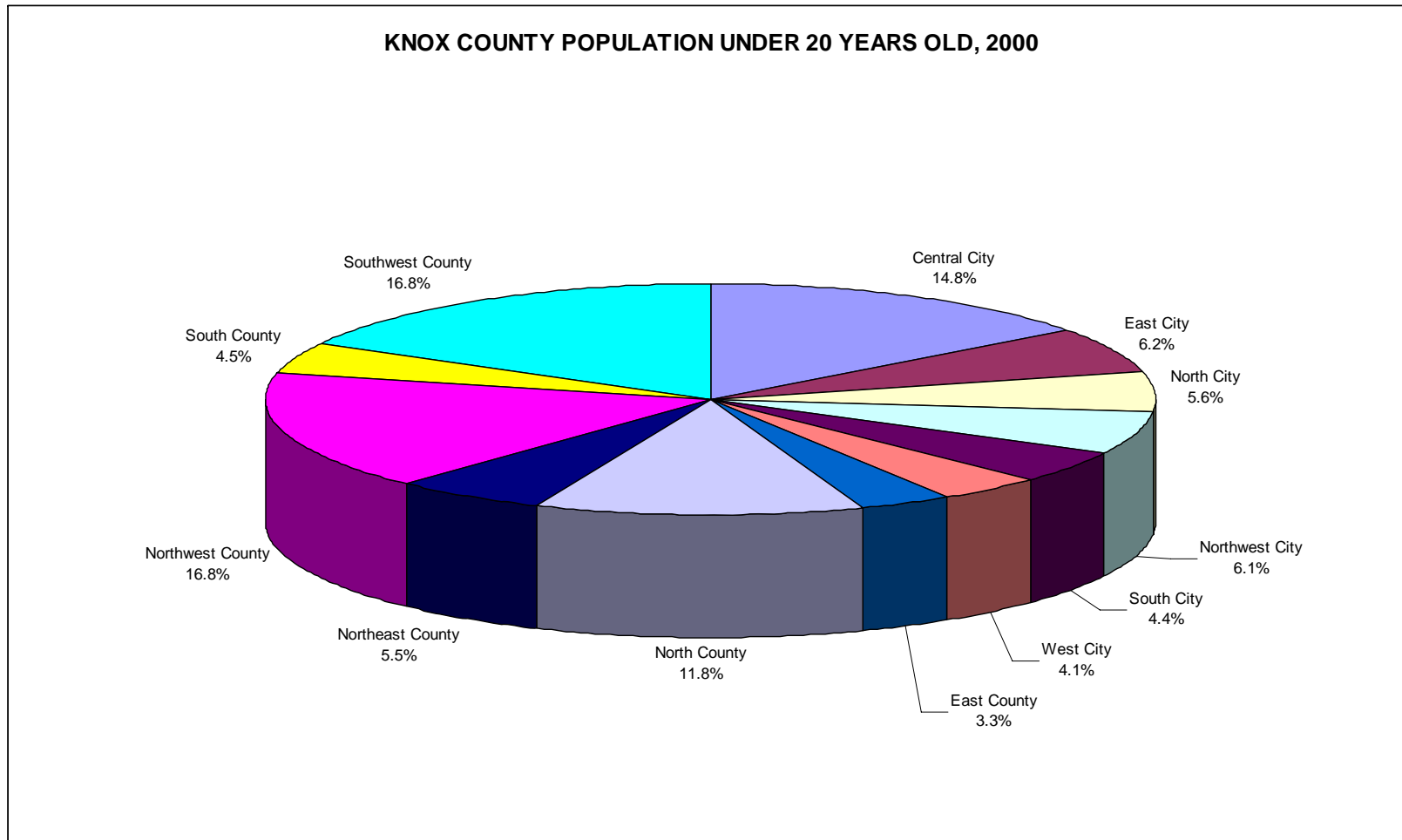


FIGURE A5



## II. RESIDENTIAL DEVELOPMENT ACTIVITY

### A. Housing Inventory Trends, 1980-2000

Between 1980 and 2000, Knox County's housing inventory grew 36 percent (Table A3). During the same period, total population increased about 20 percent. On the surface, it seems incongruous that housing growth would outpace population growth. The explanation is found in an examination of household sizes. Locally, and nationwide, average household sizes have dropped significantly over the past 25 years. In 1980, households in Knox County averaged 2.61 persons. By 1990 that number dropped to 2.42, and by 2000, it had fallen even further to 2.34. The

population continues to grow, and with fewer people living together, the demand for housing continues to grow also.

- Among the county's 12 planning sectors, only the Central City saw a decline in its housing inventory between 1980 and 2000 (Figure A6). Many units were demolished or converted to non-residential uses, while a small number of new units were built.
- Throughout the remainder of Knoxville and Knox County, residential inventory growth was

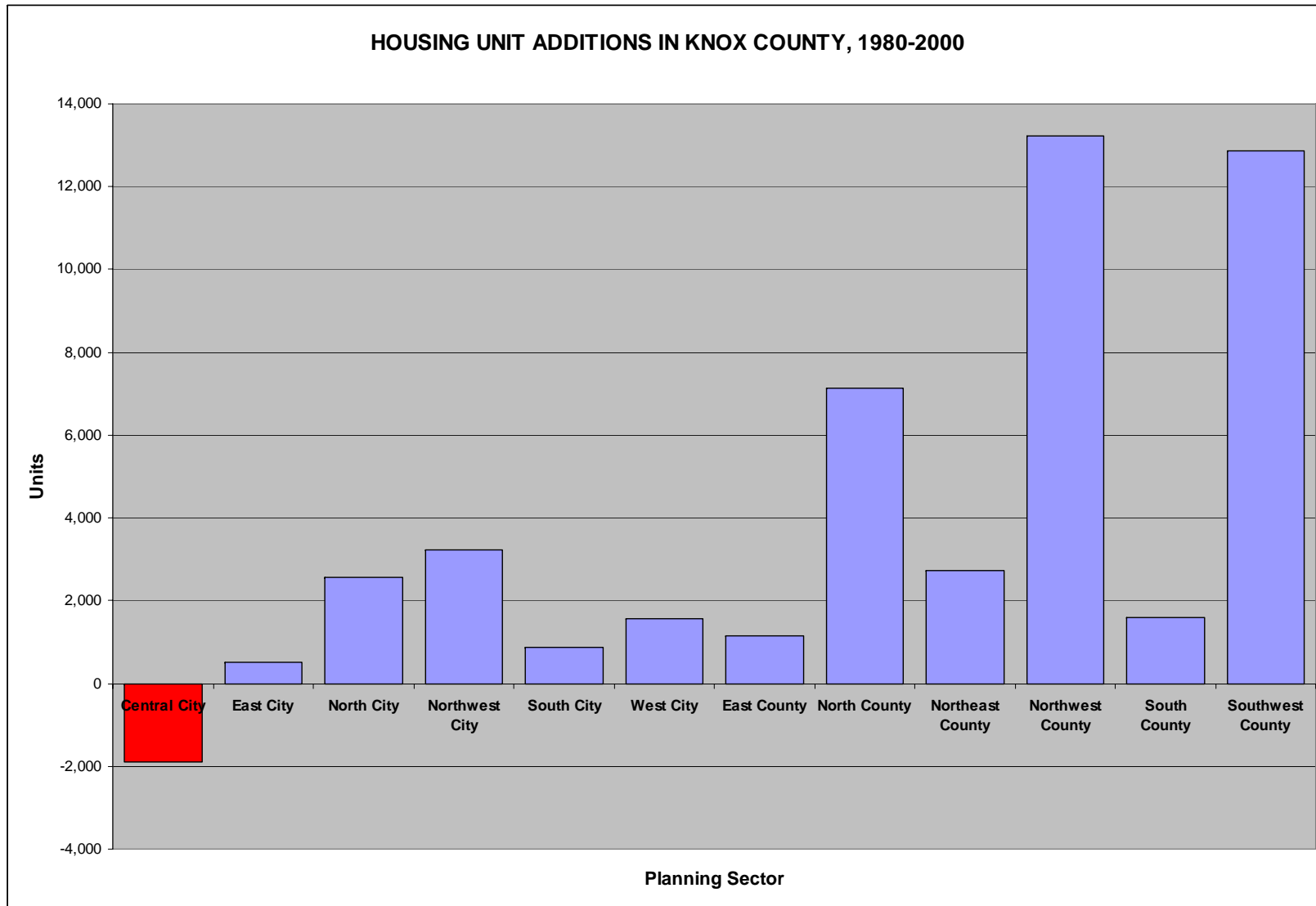
positive and substantial, particularly in the North, Northwest and Southwest County Sectors, the same areas that saw the largest shares of population increase. Northwest Sector housing inventory almost doubled, while the Southwest Sector grew more than 130 percent. The two sectors combined for about 26,000 new homes, or 57 percent of countywide growth in the 20-year period.

**TABLE A3  
HOUSING UNITS, 1980-2000**

SECTOR	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
Central City	23,990	22,691	22,105	-1,299	-586	-1,885	-5.4	-2.6	-7.9
East City	12,142	12,168	12,664	26	496	522	0.2	4.1	4.3
North City	10,109	11,433	12,682	1,324	1,249	2,573	13.1	10.9	25.5
Northwest City	10,097	11,460	13,319	1,363	1,859	3,222	13.5	16.2	31.9
South City	8,445	8,352	9,306	-93	954	861	-1.1	11.4	10.2
West City	9,275	10,049	10,847	774	798	1,572	8.3	7.9	16.9
East County	4,629	4,895	5,773	266	878	1,144	5.7	17.9	24.7
North County	10,358	12,521	17,497	2,163	4,976	7,139	20.9	39.7	68.9
Northeast County	6,452	7,225	9,174	773	1,949	2,722	12.0	27.0	42.2
Northwest County	14,026	20,340	27,247	6,314	6,907	13,221	45.0	34.0	94.3
South County	6,807	7,204	8,397	397	1,193	1,590	5.8	16.6	23.4
Southwest County	9,553	15,244	22,428	5,691	7,184	12,875	59.6	47.1	134.8
All Sectors	125,883	143,582	171,439	17,699	27,857	45,556	14.1	19.4	36.2

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

**FIGURE A6**



**B. Development Activity**

**1. Residential Subdivision Activity, 1993-2006**

- Since 1993, almost 35,000 residential subdivision lots were created in Knox County, an average of nearly 2,500 new lots per year for 14 years (Table A4 and Figure A7). Between 1994 and 1996 and in the past three years, levels surpassed the 14-year average. During the recessionary period of 2000 to 2002, new lot totals were half those of the peak years.
- City sectors accounted for 5,137 new subdivision lots, representing

14.7 percent of the countywide total. With its 85.3 percent share, county sectors had a nearly 6-to-1 advantage over the city in subdivision activity.

- The geographic distribution of new subdivision activity was unevenly spread across the county. The Southwest County Sector led all others with its one-quarter share of all new subdivision lots, and, when combined with the Northwest County Sector, 46.5 of the inventory was represented. West-side lot additions are summarized in Table A5. The North County Sector rounded out the top three with its

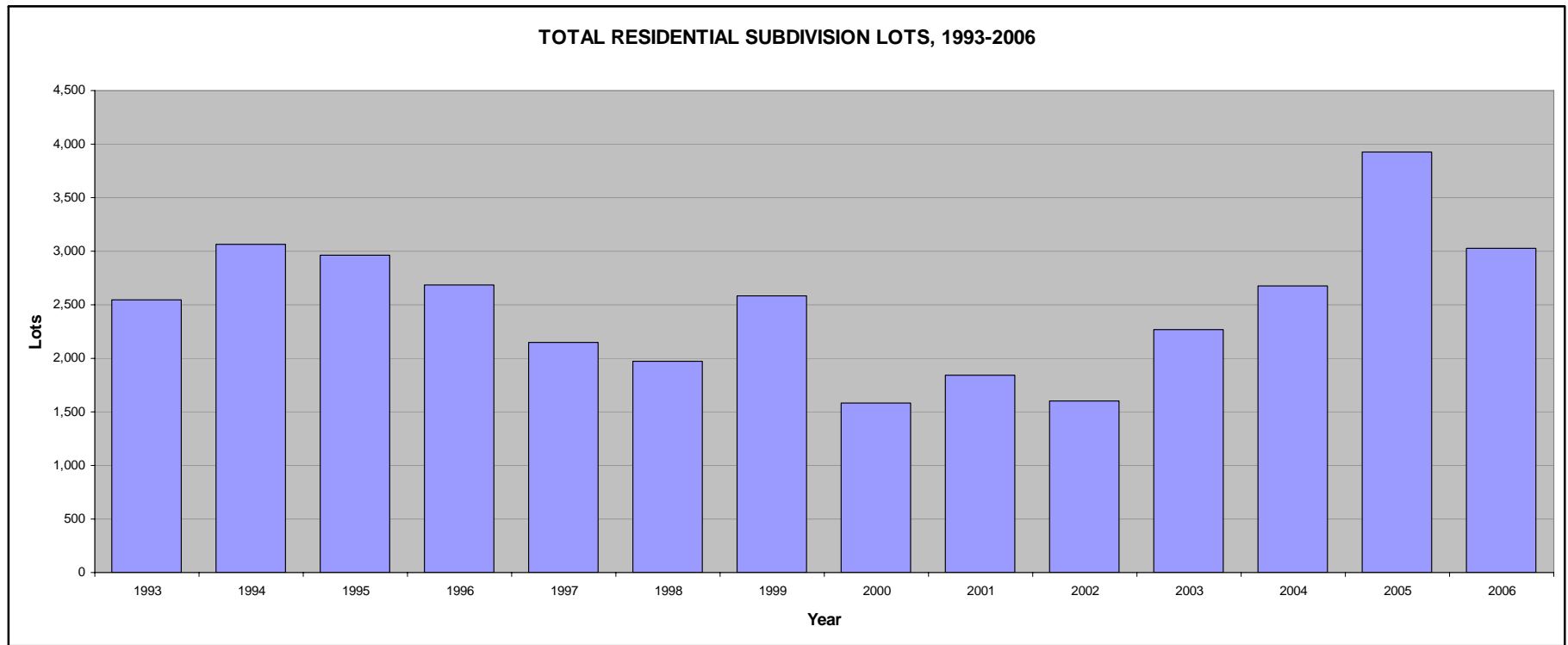
18.6 percent claim of new lot additions. Beyond the three leading sectors, the only other with a double-digit share was the Northeast County.

- The Central City Sector, home to Knoxville's oldest neighborhoods, reported only 282 new residential building lots between 1993 and 2006, nearly half of which were recorded this year. The South City, also representative of older communities, had even fewer additions, with only 76 new lots in the past 14 years. The Central and South City Sectors combined for 1.0 percent of the countywide total.

<b>TABLE A4 RESIDENTIAL SUBDIVISION LOTS, 1993-2006</b>															
<b>SECTOR</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>1993-2006 TOTAL</b>
Central City	5	3	15	4	1	1	0	93	9	3	0	7	16	125	282
East City	15	45	80	64	105	23	36	20	12	13	118	25	8	0	564
North City	18	86	36	253	93	78	121	27	56	128	176	78	154	135	1,439
Northwest City	270	310	280	147	42	129	162	54	12	59	88	80	251	254	2,138
South City	1	3	1	0	1	1	17	7	4	8	13	9	11	0	76
West City	37	17	63	187	30	45	23	33	62	2	51	14	52	23	639
East County	67	34	12	29	102	145	232	124	35	50	130	107	399	176	1,642
North County	575	741	694	535	270	464	297	236	312	370	434	465	497	581	6,471
Northeast County	151	122	180	129	240	139	444	296	418	404	65	174	623	548	3,933
Northwest County	754	804	502	613	547	369	522	116	365	148	239	1,113	1,099	456	7,647
South County	103	249	39	172	162	44	76	79	70	56	70	21	317	14	1,472
Southwest County	551	649	1065	549	555	538	656	498	483	360	883	580	499	716	8,582
All Sectors	2,547	3,063	2,967	2,682	2,148	1,976	2,586	1,583	1,838	1,601	2,267	2,673	3,926	3,024	34,881

Note: Total lot counts for 2006 are estimated for the entire year based on the average number of monthly approvals from January through August, 2006.

**FIGURE A7**



**TABLE A5  
WEST KNOX RESIDENTIAL SUBDIVISION LOTS, 1993-2006**

SECTOR	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Northwest City	270	310	280	147	42	129	162	54	12	59	88	80	251	254
West City	37	17	63	187	30	45	23	33	62	2	51	14	52	23
Northwest County	754	804	502	613	547	369	522	116	365	148	239	1,113	1,099	456
Southwest County	551	649	1,065	549	555	538	656	498	483	360	883	580	499	716
West Knox Total	1,612	1,780	1,910	1,496	1,174	1,081	1,363	701	922	569	1,261	1,787	1,901	1,448
County Total	2,547	3,063	2,967	2,682	2,148	1,976	2,586	1,583	1,838	1,601	2,267	2,673	3,926	3,024
Share of County Total (%)	63.3	58.1	64.4	55.8	54.7	54.7	52.7	44.3	50.2	35.5	55.6	66.9	48.4	47.9

## 2. Residential Building Permit Activity, 1993-2006

- On average, 3,600 residential building permits were issued in Knox County each year between 1993 and 2006. Approvals spiked at 4,129 units in 1996, then stabilized for seven years at the period average. In the past three years, peak numbers were seen again, with a period-high 4,467 approvals in 2004, and above-average totals in 2005 and 2006 (Table A6 and Figure A8).
- Over the past 10 years, about \$3.2 billion have been invested in local residential construction projects. In

2005 alone, \$421.5 million were spent on residential building, an average of \$109,250 per housing unit.

- Similar to the pattern of subdivision lot generation, the west and north portions of Knox County reported the bulk of building permit activity, capturing nearly 60 percent of the permits issued. The Southwest County Sector led the way with 21.9 percent of all residential construction. Combined, west-side city and county sectors accounted for 45 to 60 percent of new dwellings each of the past 14 years (Table A7).

- County sectors sharply outpaced city sectors in total residential building. Roughly three new housing units were constructed in the county for every one built in the city.
- While the Central City Sector reported almost no subdivision activity, there was noticeable residential development. Since 1993, about 3,100 new dwelling units were added to the city's core. Many were apartments built in Fort Sanders and condominiums converted from office and warehouse properties downtown.

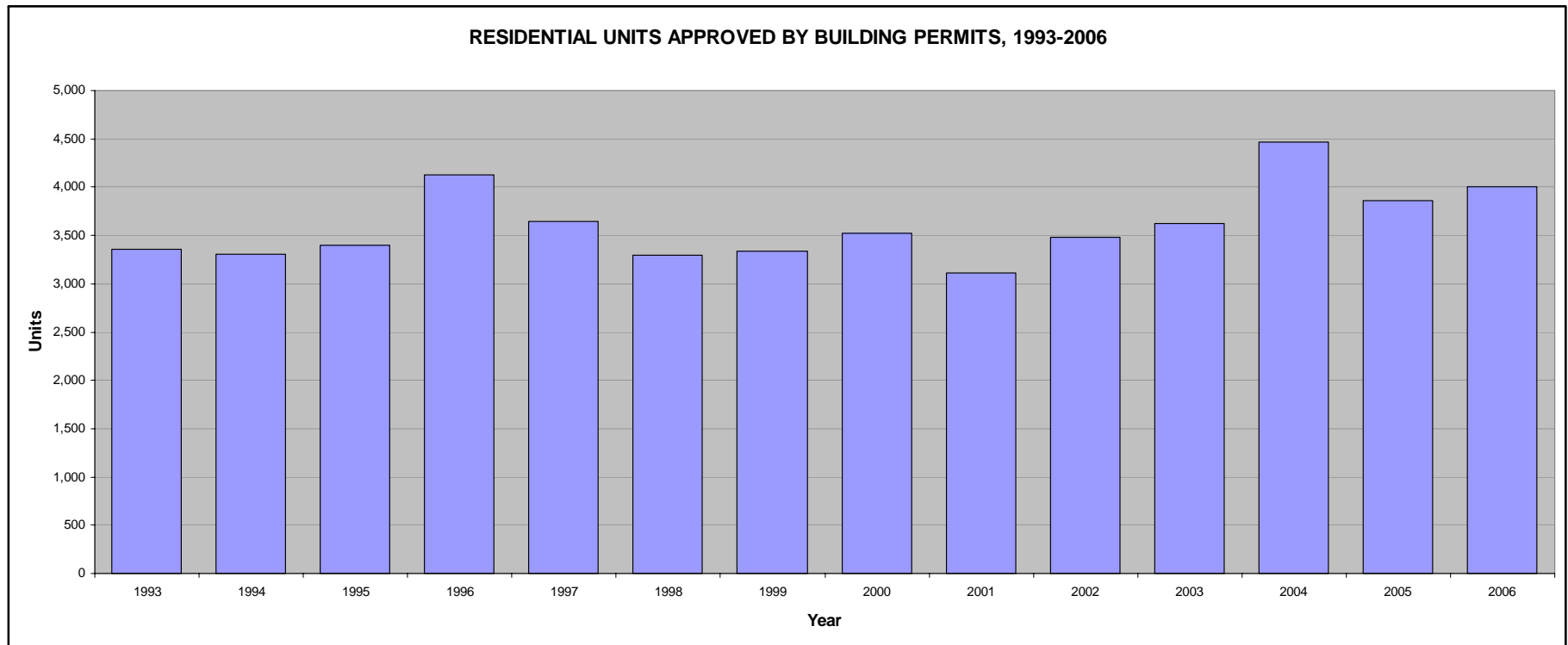
**TABLE A6  
RESIDENTIAL UNITS APPROVED BY BUILDING PERMITS, 1993-2006**

Sector	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	1993-2006 TOTAL
Central City	95	51	54	88	71	108	394	279	109	373	323	768	273	111	3,097
East City	53	64	122	108	89	56	53	96	160	83	54	61	66	225	1,290
North City	150	231	328	208	301	166	88	247	178	285	243	458	263	326	3,472
Northwest City	271	221	235	446	113	174	131	164	93	90	130	85	184	110	2,447
South City	202	11	15	96	100	231	49	37	41	31	32	34	70	285	1,234
West City	64	76	202	213	513	175	90	68	94	114	54	53	22	29	1,767
East County	52	67	83	74	82	121	194	174	181	155	120	159	155	151	1,768
North County	535	488	610	638	623	616	552	400	406	450	694	632	615	547	7,806
Northeast County	139	310	214	243	266	293	276	321	332	373	325	276	295	405	4,068
Northwest County	884	840	752	854	526	652	587	700	697	609	590	937	955	871	10,454
South County	144	148	140	150	117	150	147	108	124	145	180	139	199	178	2,069
Southwest County	769	796	644	1,011	839	555	773	923	699	770	877	865	761	763	11,045
All Sectors	3,358	3,303	3,399	4,129	3,640	3,297	3,334	3,517	3,114	3,478	3,622	4,467	3,858	3,999	50,515

Notes:

- Residential permits include single-family detached, single-family attached, multi-family, and mobile home units.
- Total permit counts for 2006 are estimated for the entire year based on the average number of monthly approvals from January through July, 2006.

**FIGURE A8**



**TABLE A7  
WEST KNOX RESIDENTIAL UNITS APPROVED BY BUILDING PERMITS, 1993-2006**

Sector	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Northwest City	271	221	235	446	113	174	131	164	93	90	130	85	184	110
West City	64	76	202	213	513	175	90	68	94	114	54	53	22	29
Northwest County	884	840	752	854	526	652	587	700	697	609	590	937	955	871
Southwest County	769	796	644	1,011	839	555	773	923	699	770	877	865	761	763
West Knox Total	1,988	1,933	1,833	2,524	1,991	1,556	1,581	1,855	1,583	1,583	1,651	1,940	1,922	1,773
County Total	3,358	3,303	3,399	4,129	3,640	3,297	3,334	3,517	3,114	3,478	3,622	4,467	3,858	3,999
Share of County Total (%)	59.2	58.5	53.9	61.1	54.7	47.2	47.4	52.7	50.8	45.5	45.6	43.4	49.8	44.3

### 3. A Closer Look: Permit Types Affect School-Aged Population

While a count of *total* residential building permits is a good indicator of school service demand, analysts should also look at the *types* of residential permits issued. Different

forms of development attract different levels of school-aged population. In the data collected for this study, building permits were categorized in four classes: single family detached, single family attached (condominiums/townhouses), multifamily

(apartments), and mobile home units. The average number of school-aged children (under 18 years of age) varies from type to type, as summarized in Table A8.

**TABLE A8  
AVERAGE NUMBER OF CHILDREN PER OCCUPIED HOUSING UNIT, BY UNIT TYPE (CENSUS 2000)**

HOUSING UNIT TYPE	PERSONS <18 YEARS OLD PER UNIT
Single family detached	0.619
Single family attached	0.207
Multifamily	0.309
Mobile home	0.695

The most commonly built residential unit locally is the single family detached home. Between 1993 and 2006, 50,515 residential units were built in Knox County, and 31,621 were single family detached, representing a 62.6 percent share of the total (Table A9). Detached units attract families with more children when compared to other housing choices. For every five single family homes built locally, about three school-aged children can be found. By comparison, it would take 10 apartment units or 15 condominiums to add three new children. Detached homes are second to mobile

homes in terms of the number of school-aged children per unit, however, mobile homes comprise a much smaller share of local building activity, capturing only 8 percent of residential development in the past five years.

- Knox County's single family home market averaged 2,259 new units annually over the past 14 years (Table A9). Above-average rates of construction were recorded in the mid-1990s, then again after 2003 (Figure A9). A slowdown was seen in the late-1990s when construction

levels fell below 2000 units per year, roughly 15 percent off the period average.

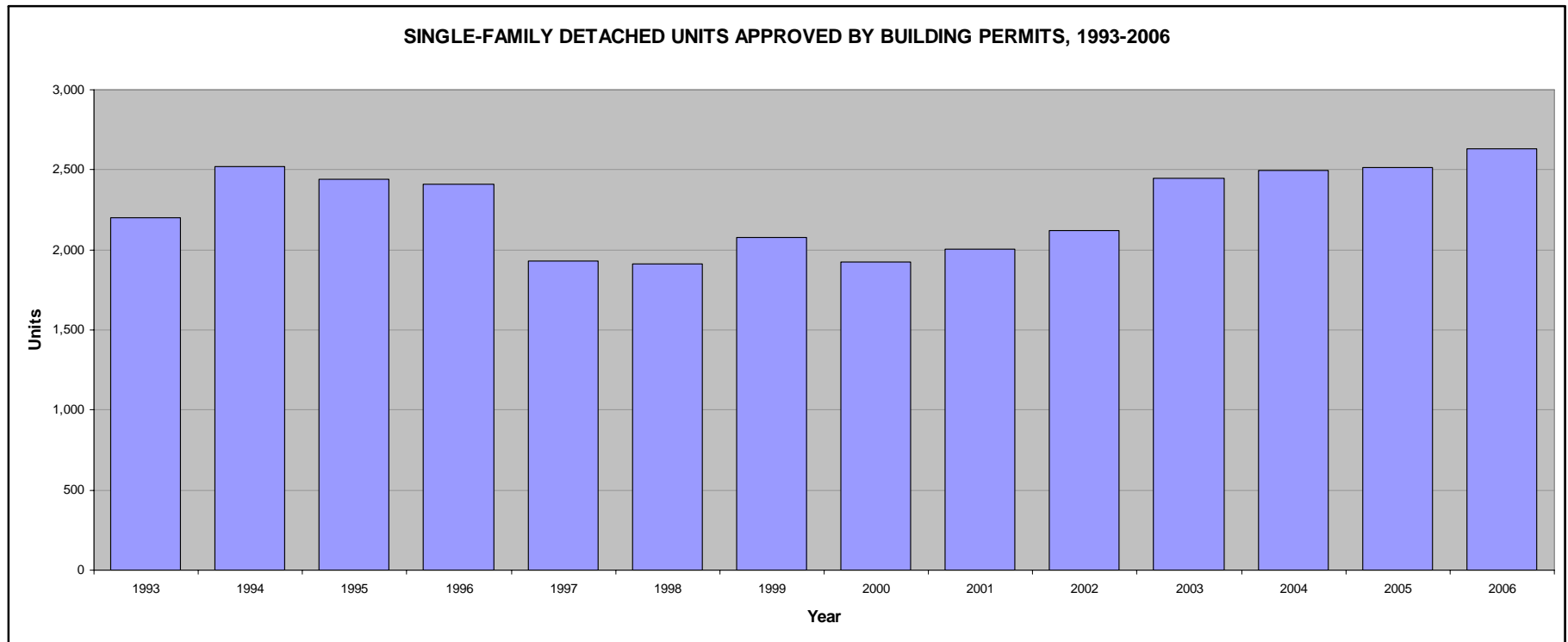
- Consistent with overall residential construction totals, the Southwest County Sector led the local market with 27.9 percent of all new single family homes. The Northwest County Sector placed second with its 21.3 percent share. West-side sectors accounted for one-half to two-thirds of single family dwellings in each of the past 14 years (Table A10).

**TABLE A9  
SINGLE FAMILY DETACHED RESIDENTIAL UNITS APPROVED BY BUILDING PERMITS, 1993-2006**

Sector	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	1993-2006 TOTAL
Central City	22	34	23	18	40	59	50	50	80	32	43	58	57	39	605
East City	23	22	66	76	54	41	38	37	58	33	36	31	44	33	592
North City	130	166	143	104	83	95	75	137	146	135	119	244	159	216	1,952
Northwest City	175	143	172	168	91	103	88	53	31	41	60	36	77	89	1,327
South City	4	6	13	14	14	20	25	18	23	16	21	18	19	26	237
West City	58	66	47	77	123	65	67	60	70	92	42	35	20	22	844
East County	31	42	57	46	42	63	119	76	67	79	56	62	87	87	914
North County	331	373	463	471	393	300	299	289	246	316	549	438	390	329	5,187
Northeast County	107	186	168	181	202	218	200	238	244	292	254	230	219	327	3,066
Northwest County	536	647	592	552	384	442	389	321	343	315	324	520	689	682	6,736
South County	74	120	113	112	74	66	71	63	79	108	121	102	112	129	1,344
Southwest County	712	714	584	588	432	438	656	582	615	663	823	720	639	650	8,816
SF Total	2,203	2,519	2,441	2,407	1,932	1,910	2,077	1,924	2,002	2,122	2,448	2,494	2,512	2,630	31,621
All Units Total	3,358	3,303	3,399	4,129	3,640	3,297	3,334	3,517	3,114	3,478	3,622	4,467	3,858	3,999	50,515
SF Share (%)	65.6	76.3	71.8	58.3	53.1	57.9	62.3	54.7	64.3	61.0	67.6	55.8	65.1	65.8	62.6

Note: Total permit counts for 2006 are estimated for the entire year based on the average number of monthly approvals from January through July, 2006.

**FIGURE A9**



**TABLE A10  
WEST KNOX SINGLE-FAMILY DETACHED RESIDENTIAL UNITS APPROVED BY BUILDING PERMITS, 1993-2006**

Sector	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Northwest City	175	143	172	168	91	103	88	53	31	41	60	36	77	89
West City	58	66	47	77	123	65	67	60	70	92	42	35	20	22
Northwest County	536	647	592	552	384	442	389	321	343	315	324	520	689	682
Southwest County	712	714	584	588	432	438	656	582	615	663	823	720	639	650
West Knox Total	1,481	1,570	1,395	1,385	1,030	1,048	1,200	1,016	1,059	1,111	1,249	1,311	1,425	1,443
County Total	2,203	2,519	2,441	2,407	1,932	1,910	2,077	1,924	2,002	2,122	2,448	2,494	2,512	2,630
Share of County Total (%)	67.2	62.3	57.1	57.5	53.3	54.9	57.8	52.8	52.9	52.4	51.0	52.6	56.7	54.9

**C. Development Trends in Local Public School Zones**

Trends in building permit and subdivision approvals are summarized for the service areas of Knox County’s public schools.

**1. Building Permit Activity**

Residential building permit figures were assembled from 2001 through 2006 and summarized for Knox County’s public school zones. In terms of total units approved, the top-five elementary, middle, and high school zones are listed in Table A11. Consistent with trends identified over the past several years, the largest shares of new

construction activity can be found in southwest and northwest Knox County, represented by school zones serving Farragut, Karns, Hardin Valley, Bearden, and other communities. North and northeast county areas also have come on strong with new investment, marked by highly ranked permit totals in the Holston Middle and Central High School zones.

<b>TABLE A11 TOTAL BUILDING PERMIT APPROVALS, 2001-2006: HIGHEST RANKED SCHOOL ZONES</b>		
<b>ELEMENTARY SCHOOLS</b>	<b>MIDDLE SCHOOLS</b>	<b>HIGH SCHOOLS</b>
Farragut Primary and Intermediate Karns Sequoyah A L Lotts Hardin Valley	Karns Bearden Farragut West Valley Holston	Karns Farragut Central Bearden West

Like overall construction totals, school zone rankings based on single family detached units showed the domination of west, north, and northeast Knox County. Note, however,

that West High fell out of the list of top-five growth areas based on single family construction (Table A12). Its overall total was boosted by substantial recent

investment in college-student apartments in Fort Sanders.

<b>TABLE A12 SINGLE FAMILY DETACHED BUILDING PERMIT APPROVALS, 2001-2006: HIGHEST RANKED SCHOOL ZONES</b>		
<b>ELEMENTARY SCHOOLS</b>	<b>MIDDLE SCHOOLS</b>	<b>HIGH SCHOOLS</b>
Farragut Primary and Intermediate Ritta A L Lotts Hardin Valley Brickey McCloud	Farragut Karns West Valley Holston Halls	Farragut Karns Gibbs Bearden Central

**2. Subdivision Lots**

Knox County's subdivision lot approvals from 2001 through 2006 were summarized by attendance zone, and schools were ranked to show areas of highest growth. The top-five zones among elementary,

middle, and high schools are listed in Table A13.

Because of the correlation between building permits and subdivision lots, it was no surprise that many of the same schools that

led in approved permits were those that recorded the highest numbers of new subdivision lots, namely schools in west, north, and northeast Knox County.

<b>TABLE A13 SUBDIVISION LOT APPROVALS, 2001-2006: HIGHEST RANKED SCHOOL ZONES</b>		
<b>ELEMENTARY SCHOOLS</b>	<b>MIDDLE SCHOOLS</b>	<b>HIGH SCHOOLS</b>
Ritta Hardin Valley Karns A L Lotts Farragut Primary and Intermediate	Karns Holston West Valley Halls Powell	Karns Gibbs Farragut Bearden Halls

Building permit approvals represent the latter stages of the development process, occurring long after the rezoning, subdivision platting, utility installation, and road construction. Lot approvals occur early in the process, thereby marking a time lag between the on-paper phases of residential

development and the actual housing construction and build-out. The lag can be months or years, depending on many factors, such as number of units proposed, availability of financing, and market forces. Assuming a typical subdivision takes two or three years to complete, lots that were

approved in the past two years or so are good indicators of where residential development will soon occur, a useful barometer of demand for education service (Table A14).

<b>TABLE A14 SUBDIVISION LOT APPROVALS, 2004-2006: HIGHEST RANKED SCHOOL ZONES</b>		
<b>ELEMENTARY SCHOOLS</b>	<b>MIDDLE SCHOOLS</b>	<b>HIGH SCHOOLS</b>
Hardin Valley Ritta Karns Carter A L Lotts	Karns Holston West Valley Halls Carter	Karns Gibbs Halls Carter Bearden

### III. KNOX COUNTY SCHOOL ENROLLMENT

#### A. Public School Enrollment

- Between 1980 and 1990, Knox County public school enrollment fell sharply, down more than 10,000 students (Table A15). All sectors except the Southwest County experienced decline. The situation reversed during the 1990s as enrollment climbed by 7,500, a 16 percent increase. Although the

Central City Sector reported further losses during this period, all others showed growth, especially in the county where double-digit gains were prevalent.

- Consistent with residential investment patterns in the county, most of the enrollment growth during the 1990s was seen in the North, Northwest, and Southwest

County Sectors, accounting for over 80 percent of all new public school students (Figure A10).

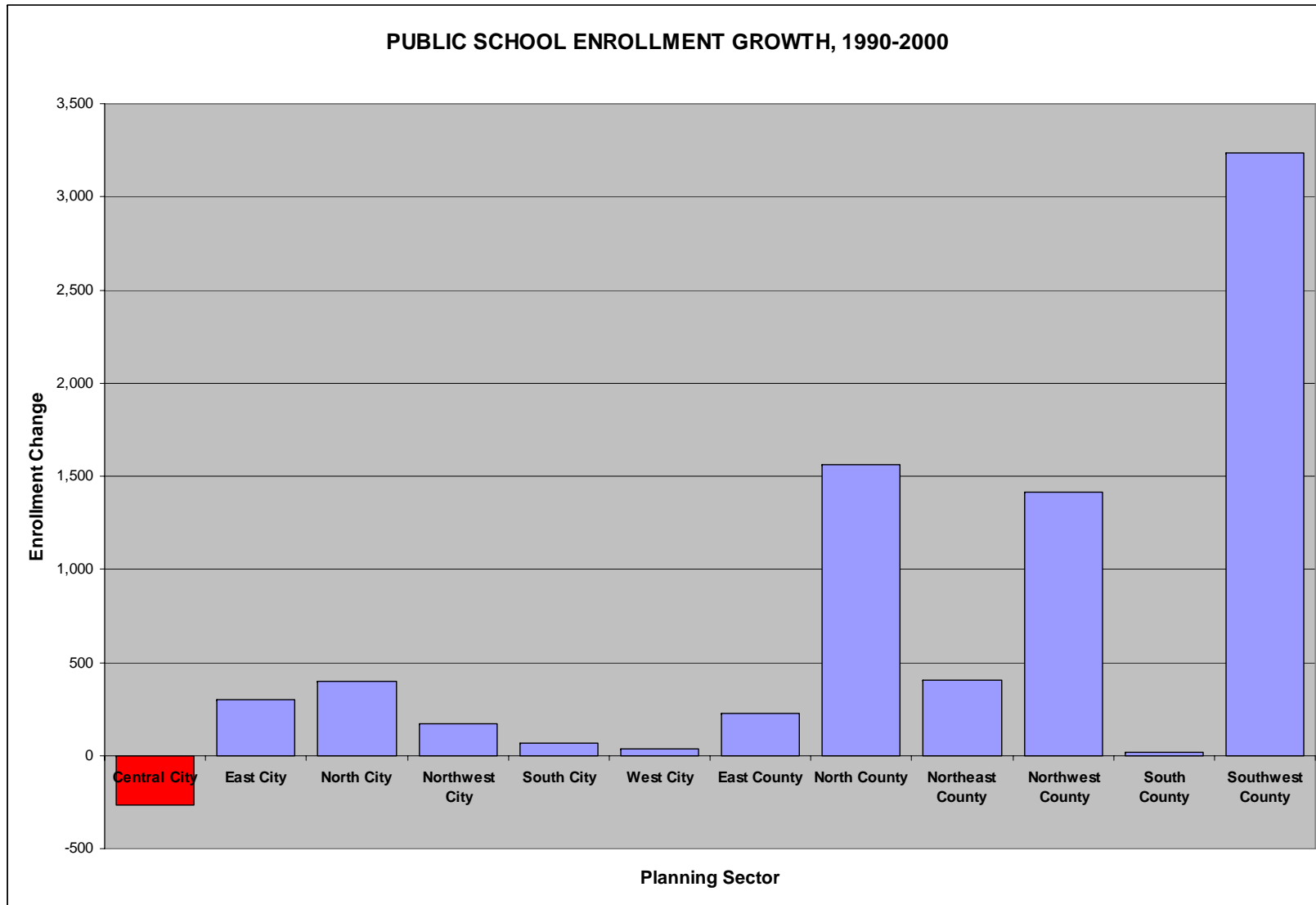
- By 2006, half of all Knox County elementary, middle, and high school students lived in only three of the twelve sectors: North, Northwest, and Southwest County Sectors (Table A16).

**TABLE A15  
PUBLIC ELEMENTARY AND HIGH SCHOOL ENROLLMENT, 1980-2000**

SECTOR	1980	1990	2000	CHANGE			CHANGE (%)		
				1980-1990	1990-2000	1980-2000	1980-1990	1990-2000	1980-2000
Central City	8,527	6,546	6,277	-1,981	-269	-2,250	-23.2	-4.1	-26.4
East City	4,640	3,563	3,863	-1,077	300	-777	-23.2	8.4	-16.7
North City	3,848	2,669	3,068	-1,179	399	-780	-30.6	14.9	-20.3
Northwest City	4,219	3,017	3,187	-1,202	170	-1,032	-28.5	5.6	-24.5
South City	3,695	2,381	2,446	-1,314	65	-1,249	-35.6	2.7	-33.8
West City	2,515	1,917	1,951	-598	34	-564	-23.8	1.8	-22.4
East County	2,660	1,932	2,159	-728	227	-501	-27.4	11.7	-18.8
North County	6,328	5,603	7,163	-725	1,560	835	-11.5	27.8	13.2
Northeast County	3,521	2,850	3,252	-671	402	-269	-19.1	14.1	-7.6
Northwest County	7,917	7,419	8,830	-498	1,411	913	-6.3	19.0	11.5
South County	3,790	2,495	2,509	-1,295	14	-1,281	-34.2	0.6	-33.8
Southwest County	5,508	6,218	9,454	710	3,236	3,946	12.9	52.0	71.6
All Sectors	57,168	46,610	54,159	-10,558	7,549	-3,009	-18.5	16.2	-5.3

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

FIGURE A10



<b>TABLE A16 KNOX COUNTY PUBLIC SCHOOL ENROLLMENT, 2006-07</b>		
<b>SECTOR</b>	<b>ENROLLMENT</b>	<b>SHARE OF TOTAL (%)</b>
Central City	5,284	9.9
East City	3,335	6.2
North City	3,036	5.7
Northwest City	3,097	5.8
South City	2,055	3.8
West City	1,849	3.5
East County	1,967	3.7
North County	7,482	14.0
Northeast County	3,529	6.6
Northwest County	9,508	17.7
South County	2,262	4.2
Southwest County	10,182	19.0
All Sectors	53,586	100.0

Note: Enrollment figures for 2006-07 were not compared to 1980-2000 figures because two different data sources were used. The 1980, 1990, and 2000 enrollments were reported by the U.S. Census Bureau, derived from sample data tabulated in *Summary File 3* of the *Census of Population and Housing*. The sample data were statistically adjusted to represent the entire county. The 2006 figures were compiled by local school officials and included a 100-percent count of enrollment. They were not sample data, and, therefore, were not directly comparable to Census figures.

Source: Knox County Schools, 2006.

<b>TABLE A17 PRIVATE SCHOOL SHARES OF TOTAL SCHOOL ENROLLMENT, 1990-2000</b>		
<b>SECTOR</b>	<b>1990 SHARE (%)</b>	<b>2000 SHARE (%)</b>
Central City	2.4	4.3
East City	6.2	10.2
North City	7.0	11.1
Northwest City	8.7	12.6
South City	5.4	8.7
West City	10.8	24.7
East County	2.1	4.2
North County	3.7	8.3
Northeast County	3.0	11.3
Northwest County	6.0	16.2
South County	6.1	11.8
Southwest County	14.1	21.7
All Sectors	6.5	13.2

Source: U.S. Census Bureau, *Census of Population and Housing*, 1980-2000.

### **B. Private School Enrollment**

- In 1980, about 3,700 students attended private school or were home-schooled, representing six percent of all school-age children in Knox County. By 1990, that share was up only slightly to 6.5 percent (Table A17). However, private

enrollment soared thereafter. Countywide, the number of private/home-school students jumped from 3,255 in 1990 to 8,248 in 2000, a 153 percent change. Recent figures from the Census Bureau's *American Community Survey* indicated growth in private

- enrollment has leveled off at the 13 percent mark.
- West City and Southwest County Sectors reported the largest shares of children enrolled in some form of private education.

**APPENDIX B: KNOX COUNTY SCHOOLS CAPACITY MODEL SUB-ELEMENTS**

<b>TABLE B1 FUNCTIONAL CAPACITY MODEL FOR KNOX COUNTY HIGH SCHOOLS: TEACHING STATIONS</b>												
<b>COMPONENTS</b>	<b>AUSTIN EAST</b>	<b>BEARDEN</b>	<b>CARTER</b>	<b>CENTRAL</b>	<b>FAR- RAGUT</b>	<b>FULTON</b>	<b>GIBBS</b>	<b>HALLS</b>	<b>KARNS</b>	<b>POWELL</b>	<b>SOUTH DOYLE</b>	<b>WEST</b>
<b><i>Teaching Stations</i></b>												
Regular Teaching Stations	43	56	38	33	75	38	32	32	46	33	63	42
Art Teaching Stations	2	3	2	2	4	1	2	2	2	2	3	2
Music Teaching Stations	6	4	2	2	3	2	2	2	2	2	2	2
CTE Teaching Stations	13	14	17	18	18	17	13	20	23	20	16	15
Special Programs Teaching Stations	8	6	9	8	8	13	4	6	7	6	1	10
ROTC Teaching Stations	1	2	0	2	2	1	2	0	2	1	10	1
PE/Wellness Teaching Stations	2	4	4	3	6	3	4	3	4	4	4	5
Driver Ed Teaching Stations	1	2	1	1	4	2		2	1	1	2	2
<b><i>Total Teaching Stations</i></b>	<b>76</b>	<b>91</b>	<b>71</b>	<b>69</b>	<b>120</b>	<b>77</b>	<b>59</b>	<b>67</b>	<b>87</b>	<b>69</b>	<b>101</b>	<b>79</b>
<b><i>Maximum Daily Stations</i></b>	<b>304</b>	<b>364</b>	<b>284</b>	<b>276</b>	<b>480</b>	<b>308</b>	<b>236</b>	<b>268</b>	<b>348</b>	<b>276</b>	<b>404</b>	<b>316</b>
<b><i>Non-Capacity Teaching Stations</i></b>												
Regular Non-Capacity Periods	72	44	32	9	27	27	35	28	24	7	43	23
Art Non-Capacity Periods	2	3	2	2	4	1	2	2	0	2	2	0
Music Non-Capacity Periods	6	2	3	3	2	3	3	1	1	4	2	3
CTE Non-Capacity Periods	20	14	18	14	14	19	12	20	18	11	12	10
Special Prog. Non-Capacity Periods	0	3	2	3	2	2	2	0	5	0	6	2
ROTC Non-Capacity Periods	1	2	0	2	2	2	2	0	0	0	0	1
PE/Wellness Non-Capacity Periods	1	0	1	2	4	4	6	2	3	2	4	5
Driver Ed Non-Capacity Periods	1	0	2	0	4	1	2	0	0	0	2	0
Sr. Project Teaching Stations	0	0	3	0	2	0	0	0	0	0	0	1
<b><i>Total Non-Cap. Teaching Stations</i></b>	<b>103</b>	<b>68</b>	<b>63</b>	<b>35</b>	<b>61</b>	<b>59</b>	<b>64</b>	<b>53</b>	<b>51</b>	<b>26</b>	<b>71</b>	<b>45</b>
<b><i>Max. Stations - Non-Capacity Net</i></b>	<b>201</b>	<b>296</b>	<b>221</b>	<b>241</b>	<b>419</b>	<b>249</b>	<b>172</b>	<b>215</b>	<b>297</b>	<b>250</b>	<b>333</b>	<b>271</b>
<b><i>TEACHING STATION UTILIZATION</i></b>	<b>66.12%</b>	<b>81.32%</b>	<b>77.82%</b>	<b>87.32%</b>	<b>87.29%</b>	<b>80.84%</b>	<b>72.88%</b>	<b>80.22%</b>	<b>85.34%</b>	<b>90.58%</b>	<b>82.43%</b>	<b>85.76%</b>

Source: Knox County Schools, 2005.

**TABLE B2  
FUNCTIONAL CAPACITY MODEL FOR KNOX COUNTY HIGH SCHOOLS: PROGRAM FACTORS**

<b>SITE BASED PROGRAM FACTORS</b>	<b>AUSTIN EAST</b>	<b>BEARDEN</b>	<b>CARTER</b>	<b>CENTRAL</b>	<b>FAR-RAGUT</b>	<b>FULTON</b>	<b>GIBBS</b>	<b>HALLS</b>	<b>KARNS</b>	<b>POWELL</b>	<b>SOUTH DOYLE</b>	<b>WEST</b>
Choral Program Students	51	387	92	247	97	92	90	126	162	141	120	223
Band Program Students	70	269	154	144	329	60	110	157	173	134	104	115
Special Programs Students	218	180	279	245	274	510	179	208	314	244	588	346
Sr. Projects and Unique Students	4	205	54	66	78	15	66	90	97	71	62	74
Bonus Period Students	16	136	34	49	233	35	0	15	34	31	0	37

Source: Knox County Schools, 2005.

**APPENDIX C: KNOX COUNTY BOARD OF EDUCATION RESOLUTION**

**RESOLUTION**

**A RESOLUTION OF THE BOARD  
OF EDUCATION FOR KNOX COUNTY,  
TENNESSEE REQUESTING AMENDMENTS  
TO MPC SUBDIVISION APPROVAL  
PROCEDURES TO REFLECT THE POTENTIAL  
IMPACT OF SUBDIVISION APPROVAL ON  
THE COUNTY SCHOOL SYSTEM.**

**REQUESTED BY: DAN MURPHY  
PREPARED BY: KNOX COUNTY LAW  
DIRECTOR**

**APPROVED AS TO FORM  
AND  
CORRECTNESS: \_\_\_\_\_  
DIRECTOR OF LAW**

**APPROVED: May 4, 2005  
\_\_\_\_\_ DATE**

**VETOED: \_\_\_\_\_ DATE**

**VEIO  
OVERRIDE: \_\_\_\_\_  
\_\_\_\_\_ DATE**

**MINUTE  
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**WHEREAS, the Board of Education understands that Knox County is a vibrant and growing community, and the Board also recognizes that growth sometimes has negative consequences; and**

**WHEREAS, one such consequence can be increasing pressures on the local public school infrastructure; and**

**WHEREAS, unrestrained residential development in various parts of Knox County has resulted in severe overcrowding in local elementary, middle and high schools, requiring rezonings that fragment communities and create significant inconvenience for the families involved, or major building projects which are a burden on the taxpayers; and**

**WHEREAS, while residential development increases the total Knox County tax base, the Board is concerned that the increase in the tax base occasioned by new residential subdivisions does not always offset the increased burdens on the local school infrastructure to which such subdivisions may contribute; and**

**WHEREAS, Knox County has developed and enacted comprehensive zoning and subdivision approval regulations; and**

**WHEREAS, currently Knox County's zoning and subdivision regulations do not take into account the burden new development can place the local education infrastructure; and**

**WHEREAS, it is the intent of the Board of Education that the MPC should undertake to determine, to the greatest extent practicable, the effect each new subdivision applied for can reasonably be expected to have upon the infrastructure and finances of the local public education system; and**

**WHEREAS, it is further the sense of the Board of Education that if the MPC can determine, to a reasonable degree of certainty, that the increased tax revenues which may be derived from the development of a new subdivision will not offset the cost to the public education system of its development, that the MPC develop regulations to offset such increased burden, including but not limited to the assessment of impact fees or denial of such subdivisions where their burden significantly outweighs their economic benefit to the community.**

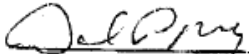
**NOW THEREFORE BE IT RESOLVED BY THE BOARD OF EDUCATION OF KNOX COUNTY AS FOLLOWS:**

The Board requests the Metropolitan Planning Commission to study the impact of each new residential subdivision applied for in Knox County, to determine whether or not the increased tax base that each such subdivision represents substantially offsets the costs associated with potentially increased burdens on the public education system.

**BE IT FURTHER RESOLVED**, that the Board further requests the MPC to develop new regulations designed to ease such burdens on the Knox County school system.

**BE IT FURTHER RESOLVED**, that if any notifications are to be made to effectuate this Resolution, then the County Clerk is hereby requested to forward a copy of this Resolution to the proper authority.

**BE IT FURTHER RESOLVED**, that this Resolution is to take effect from and after its passage, as provided by the Charter of Knox County, Tennessee, the public welfare requiring it.

 5-4-05  
Board of Education, Chairman      Date

\_\_\_\_\_  
County Clerk      Date

Approved: \_\_\_\_\_  
County Mayor      Date

Vetoed: \_\_\_\_\_  
County Mayor      Date

APPENDIX C (continued): KNOX COUNTY COMMISSION RESOLUTION

RESOLUTION

A RESOLUTION OF THE COMMISSION OF KNOX COUNTY, TENNESSEE REQUESTING AMENDMENTS TO MPC SUBDIVISION APPROVAL PROCEDURES TO REFLECT POTENTIAL IMPACT OF SUBDIVISION APPROVAL ON THE COUNTY SCHOOL SYSTEM.

RESOLUTION: R-05-9-903  
REQUESTED BY: COMMISSIONER LEUTHOLD  
PREPARED BY: KNOX COUNTY LAW DIRECTOR

APPROVED AS TO FORM AND CORRECTNESS: *[Signature]*  
DIRECTOR OF LAW

APPROVED: September 26, 2005  
DATE

VETOED: \_\_\_\_\_  
DATE

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WHEREAS, the Knox County Commission understands that Knox County is a vibrant and growing community, and the County Commission also recognizes that growth sometimes has consequences; and

WHEREAS, one such consequence can be increasing pressures on the local public school infrastructure; and

WHEREAS, unrestrained residential development in various parts of Knox County has resulted in severe overcrowding in local elementary, middle and high schools, requiring

rezonings that fragment the communities and creates significant inconvenience for the families involved, or major building projects, which are a burden on the taxpayers; and

WHEREAS, Knox County has developed and enacted comprehensive zoning and subdivision approval regulations; and

WHEREAS, currently Knox County's zoning and subdivision regulations do not take into account the burden new development can place on the local education infrastructure; and

WHEREAS, it is the intent of the Knox County Commission that the MPC should undertake to determine, to the greatest extent practicable, the effect each new subdivision applied for can reasonably be expected to have upon the infrastructure and finances of the local public education system.

NOW THEREFORE BE IT RESOLVED BY THE COMMISSION OF KNOX COUNTY AS FOLLOWS:

The Commission requests that the Metropolitan Planning Commission prepare an annual report for the Knox County Board of Education, detailing residential growth trends in Knox County for use in planning future school system expansion.

BE IT FURTHER RESOLVED, that if any notifications are to be made to effectuate this Resolution, then the County Clerk is hereby requested to forward a copy of this Resolution to the proper authority.

BE IT FURTHER RESOLVED, that this Resolution is to take effect from and after its passage, as provided by the Charter of Knox County, Tennessee, the public welfare requiring it.

Scott Moon  
Presiding Officer of the Commission      Date

Ann Marie Rodgalt  
County Clerk      Date

Approved: Michael R. Ray  
County Mayor      Date

Vetoed: \_\_\_\_\_  
County Mayor      Date

## **APPENDIX D: ADEQUATE PUBLIC SCHOOL FACILITIES LEGISLATION IN FLORIDA**

Recent legislation in Florida has mandated coordinated school planning between local government planners and school boards. Highlights of statutory provisions are presented (from Florida Department of Community Affairs, Division of Community Planning, 2002):

### **1. Future Land Use Element**

- a. Identify land use categories where public schools are allowable.
- b. Establish school site-selection criteria.
- c. Develop shared use/collocation policies (schools as community facilities, with parks, playgrounds, libraries, etc.).

### **2. Intergovernmental Coordination**

- a. School board participation in local planning agency functions, such as relevant land used decisions and service on technical committees.
- b. Local government officials participate in school board's long-range planning and facility siting committees.
- c. Develop population projections and enrollment forecasts.
- d. Assess and review facility plans and local comprehensive plans.
- e. Review the schedule of capital improvements.
- f. Assure consistency between school development plans and local comprehensive plans.

### **3. Interlocal Agreement**

- a. Formalize processes for collaborative planning and decision making.
- b. Coordinate planning activities of school boards and local governments.
- c. Share information on school board's current and planned facilities and local government's plans for development.
- d. Coordinate responses to land use decisions affecting public school capacities.
- e. Develop procedures to resolve disputes related to school planning and local development.

### **4. Evaluation and Appraisal Report**

- a. Evaluate the collaborative planning process in its attempts to coordinate school capacity and residential development.