

# **Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs**

July 2011 through June 2016

Catherine Corley, M.A.  
Research Manager  
Co-Author

Dave Keiser, M.A.  
Project Manager  
Co-Author

Melissa M. Brown, M.Ed.  
Project Manager  
Co-Author

Dianna Y. L. Miller, J.D.  
Research Associate  
Co-Author

Michael Mount, M.A.  
Research Associate  
Co-Author

Janet Steen  
Information Technology Consultant

Teresa Gibson  
Web Development & Publications Manager

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TACIR staff wish to acknowledge the efforts of the development district staff responsible for the inventory:

East Tennessee Development District

Terry Bobrowski, Executive Director  
Mollie Childress, Infrastructure Planner

First Tennessee Development District

Susan Reid, Executive Director  
Beulah Ferguson, Director of Special Projects  
Ken Rea, Deputy Director of Economic and  
Community Development  
Bill Forrester, Industrial Programs Director  
Semone Burluson, Community Development  
Project Coordinator  
Gray Stothart, Community Development  
Project Coordinator/Historical  
Preservation Planner  
Chris Craig, Assistant Director/Director of  
Environmental Management and RPO

Greater Nashville Regional Council

Sam Edwards, Executive Director  
Tim Roach, Deputy Director of Research,  
Planning, and Development  
Grant Green, Chief of Research  
Patty Cavanah, Executive Administrative  
Assistant

Memphis Area Association of Governments

Pamela Marshall, Executive Director  
James McDougal, Planner

Northwest Tennessee Development District

John Bucy, Executive Director  
Wanda Fuzzell, Planner

Southeast Tennessee Development District

Beth Jones, Executive Director  
Brian Farlow, Regional Planner  
Sam Saieed, Regional Planner

South Central Tennessee Development District

Jerry Mansfield, Executive Director  
Lisa Cross, Community Development Specialist  
Lori Fisher-Braly, Community Development  
Director

Southwest Tennessee Development District

Joe Barker, Executive Director  
Jeff Reece, Environmental Programs  
Coordinator

Upper Cumberland Development District

Mark Farley, Executive Director  
James Wheeler, Systems Coordinator  
Rhonda Hall, Administrative Assistant

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July 2013

The Honorable Ron Ramsey  
Lt. Governor and Speaker of the Senate

The Honorable Beth Harwell  
Speaker of the House of Representatives

Members of the General Assembly

State Capitol  
Nashville, TN 37243

Ladies and Gentlemen:

Transmitted herewith is the eleventh in a series of reports on Tennessee's infrastructure needs by the Tennessee Advisory Commission on Intergovernmental Relations pursuant to Public Chapter 817, Acts of 1996. That act requires the Commission to compile and maintain an inventory of infrastructure needed in Tennessee and present these needs and associated costs to the General Assembly during its regular legislative session. The inventory, by law, is designed to support the development by state and local officials of goals, strategies and programs to

- improve the quality of life of all Tennesseans,
- support livable communities,
- and enhance and encourage the overall economic development of the state through the provision of adequate and essential public infrastructure.

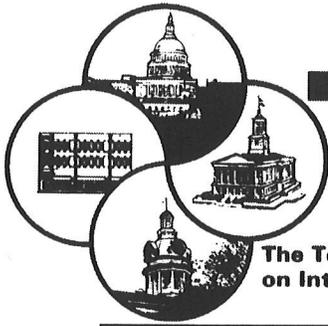
This report represents the staff's continuing efforts to improve the inventory.

Information from the annual inventory is being used for a study comparing school siting and land-use planning. Improvements in the technological infrastructure of the inventory itself have set the stage for future efforts to make the inventory more accessible and useful to state and local policy makers and to researchers. Plans include making it possible for anyone with an interest to easily access information about and compare the infrastructure needs of cities, counties, and regions.

Sincerely,

  
\_\_\_\_\_  
Senator Mark Norris  
Chairman

  
\_\_\_\_\_  
Lynnis Roehrich-Patrick  
Executive Director



# TACIR

The Tennessee Advisory Commission  
on Intergovernmental Relations



226 Capitol Boulevard Bldg., Suite 508  
Nashville, Tennessee 37243-0760  
Phone: (615) 741-3012  
Fax: (615) 532-2443  
[www.tn.gov/tacir](http://www.tn.gov/tacir)

## MEMORANDUM

**TO:** Commission Members

**FROM:**  Wynnis Roehrich-Patrick  
Executive Director

**DATE:** 25 July 2013

**SUBJECT:** Building Tennessee's Tomorrow, 2013

The Tennessee General Assembly charged the Tennessee Advisory Commission on Intergovernmental Relations (TACIR) in 1996 with developing and maintaining an inventory of public infrastructure needs "in order for the state, municipal and county governments of Tennessee to develop goals, strategies, and programs which would

- improve the quality of life of its citizens,
- support livable communities, and
- enhance and encourage the overall economic development of the state."

Each year since this mandate was created, TACIR has worked with the State's nine development districts to compile Tennessee's public infrastructure needs inventory to gather information from state and local officials. The information they provide is analyzed by TACIR staff, and an annual report is prepared for the General Assembly.

The current report is submitted for your approval. It is the eleventh in the series and comprises \$37 billion in projects reported by state and local officials for the inventory completed in fiscal year 2011-12. This most recent inventory includes projects that need to be in some stage of development during the five-year period July 2011 through June 2016. The report includes statewide information by type of project and by level of government, as well as information about the condition and needs of our public schools. The report also includes information about the availability of funding to meet reported needs and a comparison of county-area needs. County-area information about each type of infrastructure need in the inventory, as well as relevant legislation, inventory forms, and a glossary of terms can be found in the appendices to the report.



# Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs

July 2011 through June 2016

## EXECUTIVE SUMMARY

This report is the eleventh in a series on infrastructure that began in the late 1990s. These reports to the General Assembly present Tennessee's public infrastructure needs as reported by local officials, those compiled by the Tennessee Department of Transportation, and those submitted by other state departments and agencies as part of their budget requests to the Governor. The information presented in this report, collected during fiscal year 2011-12 and covering the five-year period of July 2011 through June 2016, provides two types of information: (1) needed infrastructure improvements and (2) the condition of existing elementary and secondary public schools. Needs fall into six broad categories. See table 1.

**Table 1. Summary of Reported Infrastructure Improvement Needs**  
*Five-year Period July 2011 through June 2016\**

Category**	Number of Projects or Schools Reported		Five-year Reported Estimated Cost	
	Number	Percentage	Amount	Percentage
Transportation and Utilities	4,284	46.8%	\$20,220,785,127	54.6%
Education***	1,911	20.9%	7,214,810,655	19.5%
Health, Safety, and Welfare	1,788	19.5%	6,198,429,638	16.7%
Recreation and Culture	814	8.9%	1,710,475,475	4.6%
Economic Development	134	1.5%	1,218,490,633	3.3%
General Government	222	2.4%	488,910,400	1.3%
<b>Grand Total</b>	<b>9,153</b>	<b>100.0%</b>	<b>\$37,051,901,928</b>	<b>100.0%</b>

\*For a complete listing of all reported needs by county and by public school system, see appendixes D and E.

\*\*A list of the types of projects included in the six general categories is shown in table 3. Descriptions of the project types are included in the Glossary of Terms at the end of this report.

\*\*\*Includes improvement needs at existing schools. Number of projects includes the 1,747 schools for which needs were reported.

A number of conclusions may be drawn from the information compiled in the inventory:

- The total need for public infrastructure improvements is estimated at \$37.1 billion for 2011 through 2016. This total is \$82.5 million less than the estimate in last year's report, a decrease of 0.2%. See table 2. Though relatively small, this is the first decrease in inventory history.

The Tennessee General Assembly charged the Tennessee Advisory Commission on Intergovernmental Relations (TACIR) with developing and maintaining an inventory of infrastructure needs "in order for the state, municipal and county governments of Tennessee to develop goals, strategies and programs which would

- ♦ improve the quality of life of its citizens,
- ♦ support livable communities, and
- ♦ enhance and encourage the overall economic development of the state."

*Public Chapter 817, Acts of 1996.*

**Table 2. Comparison of Estimated Cost of Infrastructure Improvement Needs**  
*July 2010 Inventory vs. July 2011 Inventory*

Category	Reported Cost		Difference	Percent Change
	July 2010 through June 2015	July 2011 through June 2016		
Transportation and Utilities	\$ 19,005,989,502	\$ 20,220,785,127	\$ 1,214,795,625	6.4%
Education	7,409,143,671	7,214,810,655	(194,333,016)	-2.6%
Health, Safety, and Welfare	7,092,042,404	6,198,429,638	(893,612,766)	-12.6%
Recreation and Culture	1,924,629,355	1,710,475,475	(214,153,880)	-11.1%
Economic Development	1,240,582,735	1,218,490,633	(22,092,102)	-1.8%
General Government	462,026,062	488,910,400	26,884,338	5.8%
<b>Grand Total</b>	<b>\$ 37,134,413,729</b>	<b>\$ 37,051,901,928</b>	<b>\$ (82,511,801)</b>	<b>-0.2%</b>

- Transportation and Utilities has always been and remains the single largest category in the inventory. Transportation and utilities increased \$1.2 billion, but the increase was not enough to offset decreases in other categories. Equaling 54.1% of all estimated costs for infrastructure improvements, transportation dwarfs all other types of infrastructure needs and increased by \$1.3 billion (6.8%). At the other end of the spectrum, telecommunication also increased by \$2.5 million (14.9%), while other utilities decreased by \$71.4 million (29.3%).
- Education, the second largest category of infrastructure needs, tends to fluctuate from year to year, exhibiting no clear upward or downward trend. The need for new public schools decreased by \$94.5 million (5.6%) in this inventory after increasing by \$188 million in the last published inventory. The need for improvements at existing schools increased by \$9.3 million, while post-secondary education and preschool needs decreased by \$95.9 million.
  - School infrastructure improvements decreased by \$91.7 million (2.5%) overall in the current inventory, driven primarily by a reduced need to build new schools and additions.
  - The number of schools rated good or excellent remains high at 93%, but local officials estimate the costs to renovate or replace schools or parts of schools at nearly \$2 billion.

- Health, Safety, and Welfare, the third largest category in the inventory, decreased the most (\$893.6 million). All seven types of infrastructure in this category decreased: water and wastewater, law enforcement, public health facilities, storm water, fire protection, solid waste, and housing. That does not necessarily mean that needs reported in past inventories have been met. Much of this year's decrease can be attributed to cancelation or postponement rather than completion of projects.
- The Recreation and Culture category as a whole decreased by 11.1% (\$214.2 million). This category includes three infrastructure types: recreation; community development; and libraries, museums, and historic sites. Since the last inventory, recreation needs decreased by 14.3% or \$157.2 million, the third largest dollar decrease in this year's inventory. Several large recreation projects were completed, the largest of which was a \$138 million stadium improvement project at the University of Tennessee in Knox County.
- The Economic Development Category decreased by 1.8% (\$22.1 million). Estimated costs decreased for both types of infrastructure in this category—industrial sites and parks and business district development—but most of the decrease (\$14.1 million) stemmed from canceled or completed industrial sites and parks projects.
- General Government is the smallest category and includes only two types of infrastructure: public buildings and other facilities. The estimated cost of public building improvements increased by 15%, or \$51.4 million. A new veterans living center in Montgomery County accounts for \$24.4 million, or nearly half (47.5%) of that increase.
- Local officials are confident in obtaining funding for only \$11.2 billion of the \$30.0 billion identified as local needs. (These figures do not include needs at existing schools or those in state agencies' capital budget requests.) Most of that amount, \$10.8 billion, is for needs that are fully funded; another \$415 million is for needs that are partially funded. That leaves another \$18.8 billion of needs for which funding is not yet available. While state revenue sources for fully funded infrastructure increased since last year, local sources,

which consist of city, county, and special district revenues, remained about the same as last year and continue to be the principal source of funding for fully funded infrastructure.

- Infrastructure is built for many reasons, including community enhancement, population growth, public health and safety, economic development, and government mandates. Around two-thirds (67%) of improvements in this inventory are needed for public health and safety, 29% is needed for population growth, and 22% is needed for community enhancement. These figures add up to more than 100% because there may be more than one reason for any particular project. These percentages are comparable to those for projects completed since 2007: public health and safety (66%), population growth (29%), and community enhancement (22%).
- Infrastructure needs and the ability to meet them vary across the state. To understand the variation in county-level infrastructure needs and local governments' ability to meet them, TACIR staff looked at infrastructure needs relative to total population, population gain, and financial resources, including local revenue sources and personal income as a measure of residents' ability to pay taxes. Both the need for infrastructure improvements and improvements that have been completed are closely related to financial resources and population. Infrastructure that is still needed is also highly correlated with population gain, but completed infrastructure is only weakly correlated with that factor. Both needed and completed infrastructure are weakly correlated with population growth rate.
- The government that owns infrastructure typically funds the bulk of its cost. For example, local officials report that 91% of the funding for county-owned projects will come from county sources. The same is true of improvements reported in the 2007 inventory that have since been completed—counties paid 88% of the cost of meeting their infrastructure needs. Likewise, cities provided 67% of the funds necessary for improvements they needed in 2007 and have completed since then and expect to provide 76% of the funds for current and future improvements. Special districts paid 83% of the cost of meeting their 2007 infrastructure needs and expect to fund 64% of their current and future costs.

# Building Tennessee's Tomorrow:

## Anticipating the State's Infrastructure Needs

July 2011 through June 2016

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# Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs

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## INTRODUCTION

One of the greatest fiscal challenges facing our elected officials is dealing with the nation's aging infrastructure. As the population grows and shifts, new classrooms must be built and equipped to meet our children's needs. As roads and bridges wear out, they must be repaired or replaced to ensure our safety. And as outdated water lines begin to crack and fail, they must be upgraded to carry clean drinking water safely and efficiently. These examples are just a few of the ever increasing demands that are plaguing state and local officials as they struggle with the daunting task of matching limited funds to unlimited needs.

Why do we rely on the public sector for roads, bridges, water lines, and schoolhouses instead of looking to the private sector? The private sector does a fine job of providing goods and services when it is possible to monitor and control their use and exclude those who cannot or will not pay an amount sufficient to generate profit. In the interest of general health and safety, excluding users is not always desirable, and profit may not always be possible. Public infrastructure is the answer when the service supported is essential to the common good and the private sector cannot profitably provide it at a price that makes it accessible to all. And so we look to those who represent us in our public institutions to set priorities and find ways to fund them.

### ***Why inventory public infrastructure needs?***

The Tennessee General Assembly affirmed the value of public infrastructure in legislation enacted in 1996 when it deemed an inventory of those needs necessary "in order for the state, municipal, and county governments of Tennessee to develop goals, strategies, and programs which would

- improve the quality of life of its citizens,
- support livable communities, and
- enhance and encourage the overall economic development of the state

## Characteristics of Infrastructure

- It serves an essential public purpose.
- It has a long useful life.
- It is infrequent and expensive.
- It is fixed in place or stationary.
- It is related to other government functions and expenditures.
- It is usually the responsibility of local government.

Joint Task Force of the National Association of Home Builders and the National Association of Counties

through the provision of adequate and essential public infrastructure.”<sup>1</sup> The public infrastructure needs inventory on which this report is based was derived from surveys of local officials by staff of the state's nine development districts,<sup>2</sup> the capital budget requests submitted to the Governor by state officials as part of the annual budget process, and bridge and road needs from project listings provided by state transportation officials. The Commission relies entirely on state and local officials to evaluate the infrastructure needs of Tennessee's citizens as envisioned by the enabling legislation.

### ***What infrastructure is included in the inventory?***

For purposes of this report, and based on the direction provided in the public act and common usage, public infrastructure is defined as

*capital facilities and land assets under public ownership or operated or maintained for public benefit.*

To be included in the inventory, infrastructure projects must not be considered normal or routine maintenance and must involve a capital cost of at least \$50,000. This approach, dictated by the public act, is consistent with the characterization of capital projects adopted by the Tennessee General Assembly for its annual budget.

Local officials were asked to describe the needs they anticipated during the period of July 1, 2011, through June 30, 2031, classifying those needs by type of project. State-level needs were derived from capital budget requests. Both state and local officials were also asked to identify the stage of development as of July 1, 2011. The period covered by each inventory was expanded to 20 years in 2000 because of legislation requiring its use by the Commission to monitor implementation of Tennessee's Growth Policy Act.<sup>3</sup> Plans developed pursuant to that act established growth boundaries for annexation by the state's municipalities. This report focuses on the first five years of the period covered by the inventory.

<sup>1</sup> Chapter 817, Public Acts of 1996. For more information about the enabling legislation, see appendix A.

<sup>2</sup> For more information on the importance of the inventory to the development districts and local officials, see appendix B.

<sup>3</sup> Chapter 672, Public Acts of 2000.

Within these parameters, local officials are encouraged to report their needs as they relate to developing goals, strategies, and programs to improve their communities. They are limited by only the very broad purposes for public infrastructure as prescribed by law. No independent assessment of need constrains their reporting. In addition, the inventory includes bridge and road needs from project listings provided by state transportation and capital needs identified by state officials and submitted to the governor as part of the annual budget process.

### ***How is the inventory accomplished?***

The public infrastructure needs inventory is developed using two separate, but related, inventory forms.<sup>4</sup> Both forms are used to gather information from local officials about needed infrastructure improvements. The second form is also used to gather information about the condition of existing public school buildings, as well as the cost to meet all facilities mandates at the schools, put them in good condition, and provide adequate technology infrastructure. Information about the need for new public school buildings and for school system-wide infrastructure improvements is gathered in the first form. TACIR staff provide local officials with supplemental information from the state highway department about transportation needs, many of which originate with local officials. This information helps ensure that all known needs are captured in the inventory.

In addition to gathering information from local officials, TACIR staff incorporate capital improvement requests submitted by state officials to the Governor's Office into the inventory. While TACIR staff spend considerable time reviewing all the information in the inventory to ensure accuracy and consistency, the information reported in the inventory is based on the judgment of state and local officials. In many cases, information is limited to that included in the capital improvements programs of local governments, which means that it may not fully capture local needs.

Projects included are those that need to be either started or completed during that period. Estimated costs for the projects may include amounts spent before July 2011 to start a project that needs to be completed during the five-year period and amounts to be spent

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<sup>4</sup> Both forms are included in appendix C.

after June 2016 to complete a project that needs to be started during the five-year period. Because the source of information from state agencies is their capital budget requests, all of those projects are initially recorded as conceptual.

In the context of the public infrastructure needs inventory, the term "mandate" is defined as *any rule, regulation, or law originating from the federal or state government that affects the cost of a project.*<sup>5</sup> The mandates most commonly reported are the Americans with Disabilities Act (ADA), asbestos, lead, and underground storage tanks.

Except in the case of existing public schools, the inventory does not include estimates of the cost to comply with mandates, only whether the need was the result of a mandate; therefore, mandates themselves are not analyzed here other than to report the number of projects affected by mandates. Even in the case of public schools, the cost for mandates reported to TACIR as part of the public infrastructure needs inventory is relatively small—less than 1% of the total.

### ***How is the inventory used?***

The public infrastructure needs inventory is both a product and a continuous process, one that has been useful in

- short-term and long-range planning,
- providing a framework for funding decisions,
- increasing public awareness of infrastructure needs, and
- fostering better communication and collaboration among agencies and decision makers.

### **The inventory promotes planning and proactive thinking.**

The public infrastructure needs inventory has become a tool for setting priorities and making informed decisions by all stakeholders. Many decision makers have noted that in a time of tight budgets and crisis-based, reactive decisions, the annual inventory process is the one opportunity they have to set funding issues aside for a moment and think proactively and broadly about their infrastructure needs. For most officials in rural areas and smaller cities, the inventory is the closest thing they have to a capital improvements program.

<sup>5</sup> See the Glossary of Terms at the end of the report.

Without the inventory, they would have little opportunity or incentive to consider their infrastructure needs. Because the inventory is not limited to needs that can be funded in the short term, it may be the only reason they have to consider the long-range benefits of infrastructure improvements.

**The inventory helps match critical needs to limited funding opportunities.**

The public infrastructure needs inventory provides the basic information that helps state and local officials match needs with funding, especially in the absence of a formal capital improvements program. At the same time, the inventory provides information needed by the development districts to update their respective Comprehensive Economic Development Strategy Reports required annually by the Federal Economic Development Administration. Unless a project is listed in that document, it will not be considered for funding by that agency. Information from the inventory has been used to develop lists of projects suitable for other types of state and federal grants as well. For example, many projects that have received Community Development Block Grants were originally discovered in discussions of infrastructure needs with local government officials. The inventory has helped state decision makers identify gaps between critical needs and available state, local, and federal funding, including an assessment of whether various communities can afford to meet their infrastructure needs or whether some additional planning needs to be done at the state level about how to help them.

**The inventory provides an annual review of conditions and needs of public school facilities.**

The schools' portion of the inventory is structured so that the condition of all schools is known, not just the ones in need of repair or replacement. Data can be retrieved from the database and analyzed to identify particular needs, such as technology. This information is useful in pinpointing pressing needs for particular schools and districts, as well as providing an overview of statewide needs. This unique statewide database provides information about the condition and needs of Tennessee's public school facilities.

**The inventory increases public awareness, communication, and collaboration among decision-makers.**

The state's infrastructure needs have been reported to a larger public audience, and the process has fostered better communication between the development districts, local and state officials, and decision makers. The resulting report has become a working document used at the local, state, and regional levels. It gives voice to the often-underserved small towns and rural communities. Each update of the report provides an opportunity for re-evaluation and re-examination of projects and for improvements in the quality of the inventory and the report itself. This report is unique in terms of its broad scope and comprehensive nature. Through the inventory process, development districts have expanded their contact, communication, and collaboration with agencies not traditionally sought after (e.g., local boards of education, utility districts, the Tennessee Department of Transportation) and strengthened personal relationships and trust with their more traditional local and state contacts. Infrastructure needs are being identified, assessed, and addressed locally and documented for the Tennessee General Assembly, various state agencies, and decision makers for further assessment and consideration.

***What else needs to be done?***

The data collection process continues to improve, and the current inventory is more complete and accurate than ever. The Commission has tried to strike a balance between requiring sufficient information to satisfy the intent of the law and creating an impediment to local officials reporting their needs. By law, the inventory is required of TACIR, but it is not required of state or local officials; they may decline to participate without penalty. Similarly, they may provide only partial information. This can make comparisons across jurisdictions and across time difficult. But with each annual inventory, participants have become more familiar with the process and more supportive of the program.

Improvements in the technological infrastructure of the inventory itself have set the stage for future efforts to make the inventory more accessible and useful to state and local policy makers and to researchers. Future work will include a closer look at financing the infrastructure needs across the state.

# Building Tennessee's Tomorrow:

## Anticipating the State's Infrastructure Needs

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### INFRASTRUCTURE NEEDS STATEWIDE

***The estimated cost of public infrastructure needed statewide remains at \$37 billion.***

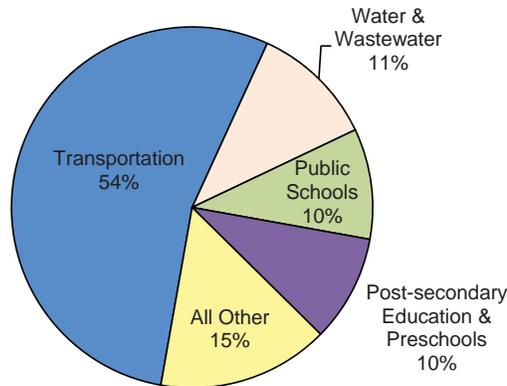
State and local officials estimate the cost of public infrastructure improvements that should be started or completed sometime between July 1, 2011, and June 30, 2016, at \$37.1 billion, a decrease of approximately \$82.5 million (see table 3).<sup>6</sup> The cost reported in the inventories is still among the

**Table 3. Comparison of Estimated Cost of Needed Infrastructure Improvements**  
*July 2010 Inventory vs. July 2011 Inventory*

Category and Type of Need	July 2010 Inventory	July 2011 Inventory	Difference	Percent Change
<b>Transportation and Utilities</b>	<b>\$ 19,005,989,502</b>	<b>\$ 20,220,785,127</b>	<b>\$ 1,214,795,625</b>	<b>6.4%</b>
Transportation	18,745,623,793	20,029,354,418	1,283,730,625	6.8%
Other Utilities	243,565,709	172,130,709	(71,435,000)	-29.3%
Telecommunications	16,800,000	19,300,000	2,500,000	14.9%
<b>Education</b>	<b>7,409,143,671</b>	<b>7,214,810,655</b>	<b>\$ (194,333,016)</b>	<b>-2.6%</b>
Post-secondary Education & Preschools	3,641,579,205	3,545,708,199	(95,871,006)	-2.6%
Existing School Improvements	1,981,658,039	1,990,971,133	9,313,094	0.5%
New Public Schools	1,698,622,427	1,604,136,323	(94,486,104)	-5.6%
School System-wide	87,284,000	73,995,000	(13,289,000)	-15.2%
<b>Health, Safety and Welfare</b>	<b>7,092,042,404</b>	<b>6,198,429,638</b>	<b>\$ (893,612,766)</b>	<b>-12.6%</b>
Water and Wastewater	4,325,943,570	4,110,530,025	(215,413,545)	-5.0%
Law Enforcement	1,710,778,162	1,157,058,758	(553,719,404)	-32.4%
Public Health Facilities	474,612,100	426,157,900	(48,454,200)	-10.2%
Storm Water	354,693,182	285,963,178	(68,730,004)	-19.4%
Fire Protection	172,205,428	170,401,678	(1,803,750)	-1.0%
Solid Waste	38,709,962	33,518,099	(5,191,863)	-13.4%
Housing	15,100,000	14,800,000	(300,000)	-2.0%
<b>Recreation and Culture</b>	<b>1,924,629,355</b>	<b>1,710,475,475</b>	<b>\$ (214,153,880)</b>	<b>-11.1%</b>
Recreation	1,100,109,103	942,863,385	(157,245,718)	-14.3%
Community Development	430,873,862	455,078,856	24,204,994	5.6%
Libraries, Museums, and Historic Sites	393,646,390	312,533,234	(81,113,156)	-20.6%
<b>Economic Development</b>	<b>1,240,582,735</b>	<b>1,218,490,633</b>	<b>\$ (22,092,102)</b>	<b>-1.8%</b>
Business District Development	979,280,620	971,260,620	(8,020,000)	-0.8%
Industrial Sites and Parks	261,302,115	247,230,013	(14,072,102)	-5.4%
<b>General Government</b>	<b>462,026,062</b>	<b>488,910,400</b>	<b>\$ 26,884,338</b>	<b>5.8%</b>
Public Buildings	342,503,826	393,884,200	51,380,374	15.0%
Other Facilities	119,522,236	95,026,200	(24,496,036)	-20.5%
<b>Grand Total</b>	<b>\$ 37,134,413,729</b>	<b>\$ 37,051,901,928</b>	<b>\$ (82,511,801)</b>	<b>-0.2%</b>

<sup>6</sup> Totals for the July 2010 inventory have been adjusted because a systematic error involving state agencies' capital needs resulted in overestimating their cost in last year's report. For complete listings of all needs reported in the July 2011 inventory by county and by public school system, see appendixes D and E.

**Figure 1. Percent of Total Reported Cost of Infrastructure Needed, by Type of Infrastructure**  
*Five-year Period July 2011 through June 2016*



Note: Public school needs consist of existing school improvements, new public school construction needs, and school system-wide needs.

highest ever, with transportation, water and wastewater, and education infrastructure needs dominating. Collectively, these types of infrastructure represent 85% of the total estimated costs reported (see figure 1).

Some transportation and water and wastewater projects are needed to support other types of public infrastructure improvements. When that's the case, those costs are included with the infrastructure they support to show the full cost of that improvement. The same is true for all property acquisition and some utilities improvements. For example, if

a rail spur is needed to create a new industrial site, then the rail spur is recorded in the inventory as an industrial site project with transportation as its secondary project type. Similarly, if a sewer line is needed for a new school, then the sewer line is recorded as new school construction with water and wastewater as its secondary type. This dual classification allows more flexibility in analyzing the costs of different types of infrastructure improvements. Those costs are included with the infrastructure they support in table 3 on the previous page and throughout this report except where they are broken out in table 4 below.

**Table 4. Comparison of Needs that Support Direct Service to Private Sector and Needs that Support Other Public Infrastructure**  
*Five-year Period July 2011 through June 2016*

Type of Need	Direct Support to Private Sector		Support Other Public Infrastructure Needs		Type Total
	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]
Transportation	\$20,029.4	99.3%	\$ 134.9	0.7%	\$ 20,164.2
Water and Wastewater	4,110.5	99.3%	28.0	0.7%	4,138.5
Storm Water	286.0	99.1%	2.5	0.9%	288.5
Other Utilities	172.1	99.3%	1.3	0.7%	173.4
Telecommunications	19.3	32.6%	40.0	67.5%	59.3
Property Acquisition	0.0	0.0%	302.0	100.0%	302.0
<b>Grand Total</b>	<b>\$ 24,617.3</b>	<b>98.0%</b>	<b>\$ 508.6</b>	<b>2.0%</b>	<b>\$ 25,125.9</b>

***Increases in transportation infrastructure needs mask decreases in most other types of infrastructure.***

Equaling 54.1% of all estimated costs for infrastructure improvements, transportation dwarfs all other types of infrastructure needs. Transportation has comprised about half of all needed infrastructure in each of the last six reports. It is so large that it more than offsets decreases elsewhere in the Transportation and Utilities category and nearly offsets all other decreases in the inventory. The need for transportation infrastructure increased by nearly \$1.3 billion—the largest increase for any one type of infrastructure.

Transportation infrastructure includes more than just roads. Although road projects dominate, bridges, sidewalks, and signalization are also classified as transportation. And roads are not the only transportation infrastructure that increased. As shown in table 5, the estimated cost to improve or build new roads increased by \$910.7 million (6.4%) since the last inventory, comprising \$15.2 billion or slightly more than three-fourths of the \$20 billion total, a record high.<sup>7</sup> Projects identified as roads can, and often do, include other transportation infrastructure, such as bridges, sidewalks, and signalization.

**Table 5. Transportation Needs: One-year Comparison 2010 and 2011**

Subtype	July 2010 Inventory	July 2011 Inventory	Difference	Percent Change
Road	\$14,311,715,448	\$15,222,379,321	\$ 910,663,873	6.4%
Bridge	3,060,372,696	3,402,789,672	342,416,976	11.2%
Rail	342,861,733	347,634,203	4,772,470	1.4%
Navigation	338,173,693	338,723,693	550,000	0.2%
Sidewalk	143,099,866	166,412,141	23,312,275	16.3%
Intelligent Transportation Systems	124,196,784	174,315,913	50,119,129	40.4%
Air	159,568,935	121,968,398	(37,600,537)	-23.6%
Signalization	76,204,009	78,947,824	2,743,815	3.6%
Public Transit	21,350,000	21,136,000	(214,000)	-1.0%
Other	168,080,629	155,047,253	(13,033,376)	-7.8%
<b>Total</b>	<b>\$18,745,623,793</b>	<b>\$20,029,354,418</b>	<b>\$1,283,730,625</b>	<b>6.8%</b>

Other than roads, the greatest need is for bridges. Across the state, 492 new bridge projects were added at a cost of \$715.2 million, with eleven projects in Shelby County accounting for nearly one-third

<sup>7</sup> Because completion of a single project may involve various elements that are not reported separately, any given subtype in table 5 may include components that fall into other subtypes.

(\$248.2 million) of that total. Of those, the largest is a \$55.9 million bridge rehabilitation project over Nonconnah Junction Creek at Bill Morris Parkway. The state's bridges have improved since 2009, when with the General Assembly's approval, the Tennessee Department of Transportation (TDOT) implemented its Better Bridges Program to reduce the number of structurally deficient bridges.<sup>8</sup> Under the program, more than 200 bridges were slated for repair, replacement, or rehabilitation over four years. In fiscal year 2011-12 alone, TDOT dedicated more than \$107 million to bridge repair and replacement.<sup>9</sup> Even with this investment, TDOT estimates that it would take an additional \$3.1 billion to repair all of the state's deficient bridges.

ITS, which includes emergency warning systems and similar infrastructure, increased by \$50.1 million or 40.4% since the last inventory. The majority of the increase came from nine new ITS projects with a total estimated cost of \$36.9 million. Nearly three-fourths (71%) of this total is for projects in three counties: Coffee (\$5.5 million), Hamilton (\$13.7 million), and Williamson (\$7 million).

The estimated cost to improve or build additional sidewalks increased by 16.3% since the last inventory, from \$143.1 million to \$166.4 million. This can be attributed in part to a national push to invest in safer routes to schools. In 2005, Congress passed legislation to establish the national Safe Routes to School program, making this effort a top priority. From 2005 to 2011, funding for Tennessee's Safe Routes to School program more than tripled, increasing from \$1 million to \$3.8 million (281%).<sup>10</sup> Across the state, thirty-one new sidewalk projects were added since the last inventory alone, totaling \$17.9 million. Six projects in four counties (Cumberland, Dyer, Shelby, and Weakley) account for close to half (41% or \$7.4 million) of that total.

Telecommunications, the smallest type of need in the Transportation and Utilities category, with the addition of a \$5 million broadband project in Gibson County added to this year's inventory, increased by 14.9%, a significant percentage change for this group of infrastructure needs.

<sup>8</sup> See <http://news.tn.gov/node/2523> (accessed May 13, 2013).

<sup>9</sup> See <http://www.tdot.state.tn.us/bridgeinfo/reports/BridgeFacts.pdf> (accessed May 13, 2013).

<sup>10</sup> National Center for Safe Routes to School. See <http://www.saferoutesinfo.org> (accessed May 8, 2013).

While transportation needs are growing overall, several transportation subtypes decreased. Infrastructure for air transportation decreased 23.6%, with ten projects completed at a cost of \$34.7 million. Nearly half of this total was for a \$15.5 million taxi lane project in Blount County at the McGhee Tyson Airport, which belongs to the City of Knoxville. Public transit infrastructure, which does not include buses or other rolling stock, decreased a small amount (1.0%), and other transportation infrastructure, including items like maintenance buildings and salt bins, decreased 13 million (7.8%). Twelve other transportation projects were completed at a cost of \$15.7 million, and eight new projects were added at a cost of \$3.2 million.

The third type of infrastructure in the Transportation and Utilities category, other utilities, decreased by the second largest percentage (29.3% or \$71.4 million) in the inventory, mainly because the start date for a \$56.4 million underground utilities project in Sevier County was moved out one year; that project is not included in the five-year period covered by this report.<sup>11</sup>

***Improvements in other categories total \$17 billion, with all but one decreasing since last inventory.***

Compared with the total estimated cost for the Transportation and Utilities category, the totals for the other categories are relatively small. At \$488.9 million, General Government is the smallest category for total estimated costs and is the only other category that increased overall. It includes only two types of infrastructure: public buildings and other facilities, which include storage, maintenance, and similar facilities that do not fit the definition of a more specific type of infrastructure. The estimated cost of needs reported in the General Government category increased by \$26.9 million or 5.8%. A new veterans living center project in Montgomery County accounts for \$24.4 million or nearly half (47.5%) of the \$51.4 million increase in the estimated cost of public building improvements.

Estimated costs for Health, Safety, and Welfare infrastructure—the third largest category in the inventory—decreased by 12.6% or \$893.6 million. All seven types of infrastructure included in this category decreased in this inventory. Infrastructure needed for law

<sup>11</sup> It should be noted that the Transportation and Utilities category does not include water utilities; those needs are reported in the Health, Safety, and Welfare category.

enforcement and water and wastewater account for most of the decrease. The fact that some types of infrastructure in this category had some of the largest decreases should not be taken to mean that needs reported in past inventories have been met. Much of the decrease can be attributed to canceled or postponed projects rather than completions.

Law enforcement—the second largest type of infrastructure in this category—decreased by the largest dollar amount (\$553.7 million) and the largest percentage (32.4%) of any type of infrastructure in the inventory, stemming from changing timelines and from the cancellation or completion of several projects. Although \$53.6 million for twenty-seven projects was added, that was not enough to offset the needs that were pushed back, completed, or canceled. Twelve projects totaling \$302.6 million were pushed back primarily because of budget considerations according to officials at the Tennessee Department of Corrections. Of those postponed, the largest was a \$125 million women's prison in East Tennessee. While that project is still needed, the need is not immediate according to state officials. Although several law enforcement projects were put on hold, both state and local officials have made some progress since the last inventory, completing twenty-four projects at a total cost of \$121.9 million. Six of those projects—three jails, one police station, a justice center, and an armed forces center—account for three-fourths (75.3%) of that total (\$91.8 million). Twenty-six projects were canceled, accounting for another \$171.2 million, the largest being a \$43.2 million Tennessee Department of Safety headquarters in Davidson County.

Water and wastewater, the largest type of infrastructure in the Health, Safety, and Welfare category and the second largest in the entire inventory, decreased by the second largest dollar amount overall, approximately \$215.4 million (5%). The change in water and wastewater infrastructure needs makes up about 24.1% of the dollar decrease in this category and can be mostly attributed to the completion of more than 100 projects totaling \$324.9 million. Three projects in Davidson County and seven projects in Sullivan County make up most of that decrease. The largest project in Davidson County, a wastewater management facility, was completed at a cost of \$119.2 million, and the largest project in Sullivan County, a wastewater treatment plant expansion, was completed at a cost of \$21.3 million. Estimates for 38 water and wastewater projects were revised downward, accounting for another \$80.3 million. The

estimated cost of one of these projects—the refurbishment of a water treatment plant in Davidson County—decreased by 44.2%, from \$33 million to \$18.4 million. Historically, the need for water and wastewater fluctuates from year to year.

The estimated costs for storm water, public health facilities, and solid waste also decreased but much less dramatically. Infrastructure for storm water decreased by \$68.7 million (19.4%), attributed mostly to the scaling back of a storm water project in Washington County from \$40 million to \$7 million and the completion of a \$27.4 million infiltration project in Sullivan County. The decrease in solid waste comes primarily from the completion of a single project—a \$3.2 million fleet maintenance facility project in Williamson County. Estimated costs for public health facilities decreased by \$48.5 million (10.2%). Public health facilities costs increased over the last four inventories but decreased in the current inventory; however, if not for the cancellation of a \$94 million project in Knox County for a state psychiatric hospital, these costs would have increased \$45.5 million over the last inventory. Since the last inventory, only eleven public health facility projects were completed, totaling \$5.8 million.

The Recreation and Culture category as a whole decreased by 11.1% or \$214.2 million since the last inventory. This category includes three types of infrastructure: libraries, museums, and historic sites; recreation; and community development. Costs for library, museum, and historic site infrastructure decreased by the third largest percentage overall, 20.6% (\$81.1 million). Three projects decreased by a total of \$73.5 million. The largest was a state library and archives building in Davidson County, which was scaled back from \$71.1 million to just over \$2 million. In addition, the cost to relocate the metropolitan archives in Nashville decreased from \$5.7 million to \$1.6 million, and the cost to renovate and convert a former school in Jonesborough into a center for the arts decreased from \$700 thousand to \$300 thousand.

The need for recreation-related infrastructure decreased by 14.3% or \$157.2 million, the third largest dollar decrease in this year's inventory. Several large recreation projects were completed, the largest of which was a \$138 million stadium improvement project at the University of Tennessee in Knox County. Some smaller recreation projects were canceled, ranging in cost from \$50,000 for a greenway signage project in Knox County to \$10.7 million for a new park in

“Infrastructure is the foundation of our communities, and without it, our businesses, schools, and our everyday lives cease to function. . . . Simply, we must invest in our roads, bridges, ports, and water systems. This will help us build a 21st Century America for an ever-changing 21st Century economy.”

Gregory E. DiLoreto  
American Society of Civil  
Engineers, 2013.

Middle Tennessee (no location specified). The costs of community development infrastructure increased by \$24.2 million (5.6%), the only type of infrastructure in this category that increased. The bulk of this increase was for a civic center project in Sevier County, which increased from \$30 million to \$45 million, along with a welcome center in Sullivan County that went from \$1 million to \$12.5 million.

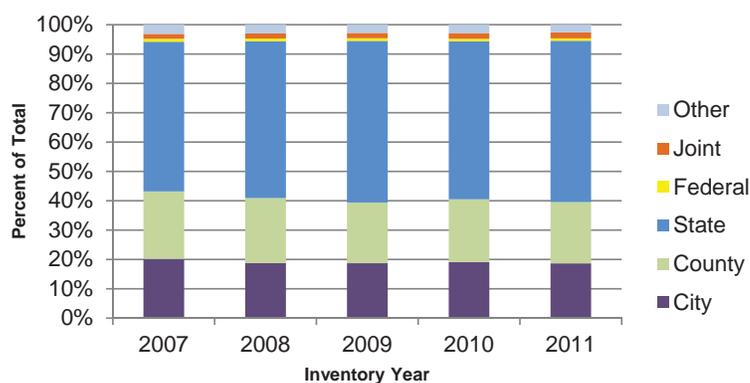
Infrastructure needs in both the Economic Development and the Education categories decreased by less than 3%. Economic Development costs decreased by \$22.1 million (1.8%). Both types of infrastructure in this category, industrial sites and parks and business district development, decreased. The decrease for industrial sites and parks, \$14.1 million, stems from several projects that were canceled or completed, the largest being the cancellation of a \$5 million industrial park in Hawkins County. Six completed projects—the largest of which was a \$2 million industrial park in White County—account for \$7 million of the decrease. Business district development costs decreased by \$8 million, less than 1%, since the last inventory, mainly because a business park in Putnam County decreased in cost from \$19 million to \$14.4 million and a \$3 million incubator project in Cumberland County was completed. Together, these two projects account for nearly all of the decrease in business district development.

Education, the second largest category, tends to fluctuate from year to year, exhibiting no clear upward or downward trend. Since the last inventory, total education infrastructure costs decreased by \$194.3 million (2.6%), mostly because of decreases in post-secondary education and preschool needs type. Post-secondary education and preschool infrastructure includes improvements at the state's public colleges and universities, post-secondary vocational programs, and pre-kindergarten programs, such as Head Start. These costs decreased for the first time since the inventory began, declining \$95.9 million. While 90 new post-secondary education and preschool projects were added at a cost of \$298.8 million, this was not enough to offset the cost of projects that were canceled, completed, or scaled back, which totaled \$538.4 million. The estimated cost for new public schools decreased by \$94.5 million (5.6%) in this inventory, mostly because eleven projects totaling \$191.2 million were completed. School-system-wide needs decreased by \$13.3 million (15.2%), mainly because seven projects totaling \$19.6 million were canceled. Details about Tennessee's public schools are discussed in the school chapter later in this report.

**State infrastructure improvements continue to dominate overall, and county improvements continue to exceed those of cities.**

Although local officials report a greater need for new infrastructure than state officials report, they won't necessarily own it all. Many of the needs identified by local officials, such as state or federal highway improvements, may be owned or controlled by either federal or state agencies. State agencies own or will own more than half of all public infrastructure in the inventory (55.1%), roughly the same as last year. The largest portion of six of the 21 types (transportation; post-secondary education and preschools; school system-wide needs; law enforcement; public health facilities; and libraries, museums, and historic sites) belongs to the state. Slightly more than three-fourths (76.8%) of transportation infrastructure improvements are the responsibility of the state. Figure 2 illustrates that the distribution of infrastructure needs by level of government has remained fairly constant over the last five inventories.

**Figure 2. Five-year Comparison of Ownership and Percent of Total Reported Cost of Infrastructure Needs by Level of Government**



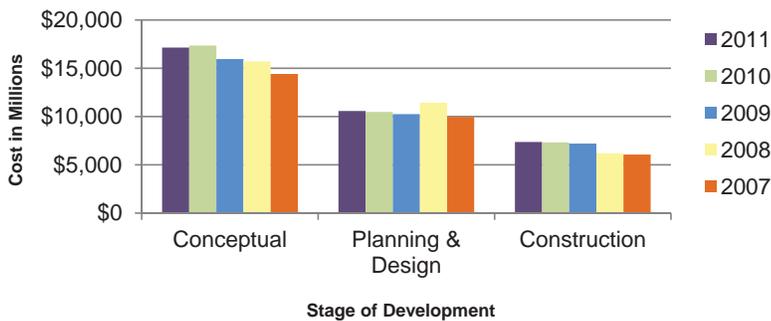
Nearly all improvements needed for post-secondary education and preschool infrastructure (99.9%) belong to the state's public colleges and universities. In fact, these improvements, combined with transportation, comprise the bulk of state-owned infrastructure in the inventory, accounting for \$18.9 billion of the \$20.4 billion total reported for state government. The next largest areas of state responsibility are law enforcement and public health facilities. As shown in table 6, state needs exceed half of the totals for both of these types of infrastructure even though the dollar amounts are relatively small. Law enforcement costs comprise 54.3% (\$628.2 million), and public health facilities account for 89.5% (\$381.3 million). When transportation projects are excluded from total costs, ownership is more evenly distributed across cities (27.7%), counties (34.8%), and the state (29.6%), with 2.1% in joint ownership, 5.8% owned by other types of governmental entities such as utility districts, and only a tiny fraction (0.1%) in federal ownership. See table 6.

At the local level, infrastructure needed by counties slightly exceeds that needed by cities overall. Counties' improvements make up over 85.2% of the Economic Development category because of the new convention center in Nashville. The convention center accounts for 72.5% of the estimated cost for all of business district development and 57.8% of the total for the entire Economic Development category. The convention center is treated as a county need because it is reported by a metropolitan government. Metropolitan governments have the characteristics of incorporated places and remain administrative divisions of the state with all the responsibilities of counties. For that reason, they are treated as county governments in the inventory. Counties are also responsible for most of the new school construction (91.7%), solid waste (74.4%), and existing school improvements (71.7%).

On the other hand, cities need the largest portion in the Recreation and Culture category (56.5%); the General Government category (55.7%); and the Health, Safety, and Welfare category (41.3%). Cities need most of the infrastructure in 9 of the 21 project types in the inventory. Nearly half of the water and wastewater infrastructure (48.3%) and the public buildings infrastructure (49.5%) in the inventory will belong to cities as will most of public housing (96.6%), storm water (96.7%), other facilities (81.5%), fire protection (79.1%), community development infrastructure (74.8%), and recreation (55.5%). Cities also need most of the other utilities infrastructure (50.9%), which includes such things as extensions to natural gas lines and power substations.

***The overall distribution of needs by stage of development has remained relatively consistent over the last five years.***

**Figure 3. Five-year Comparison of Total Reported Cost of Infrastructure Needs by Stage**



Infrastructure is also reported by stage of development, representing the various phases through which projects progress. These stages include conceptual, planning and design, and construction. Based on analysis described in the chapter on local needs (later in this report), stage of development may vary based on several factors, including

taxable property values per capita, taxable sales per capita, population change, and total population.

Although infrastructure still in the conceptual stage decreased slightly and improvements in each of the other two stages increased by small percentages, the overall distribution of infrastructure by stage has remained relatively consistent over the last five years (see figure 3). The total estimated cost of conceptual improvements is nearly half (48.9%) of all reported needs in this year's inventory. Improvements in the planning and design phase increased only slightly (from \$10.5 billion to \$10.6 billion or from 29.8% to 30.1%). Improvements under construction also increased by only a small percentage (from \$7.3 billion to nearly \$7.4 billion or 20.8% to 21%). See figure 4. The new Nashville convention center, which remains under construction, makes up most of the needs in the construction phase in the Economic Development category. Infrastructure in the conceptual stage continues to dominate five of the six major categories, all but Economic Development.

Infrastructure in the Education category remains mostly conceptual because many projects that were under construction in the last inventory have now been completed, and few projects have moved on to construction. Last year, \$705 billion in post-secondary education and preschool projects were under construction. Currently, only \$534 million for projects of that type are under construction. See table 7.

### **State and federal mandates affect 4.7% of all projects.**

Commission staff do not ask local or state officials to identify costs related to state and federal mandates—except for infrastructure at existing schools—because officials reporting their needs often do not have the detailed information necessary to separate that out of total project costs (e.g., the cost of ramps and lowered water fountains required by the Americans with Disabilities Act or ADA). They are asked, however, to indicate whether the costs of any projects are affected by mandates. While it is impossible to determine how much of the estimated total costs are associated with state and federal mandates, it is possible to determine the overall number of projects affected by mandates. It is a relatively small portion (4.7%) of the total in this inventory and only slightly higher than the percentage reported in last year's inventory (4.4%) (see table 8). The long-

**Figure 4. Percent of Total Reported Cost of Infrastructure Needs by Stage of Development**  
Five-year Period July 2011 through June 2016

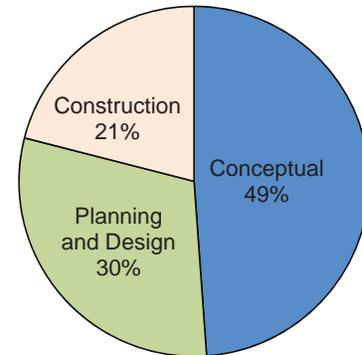
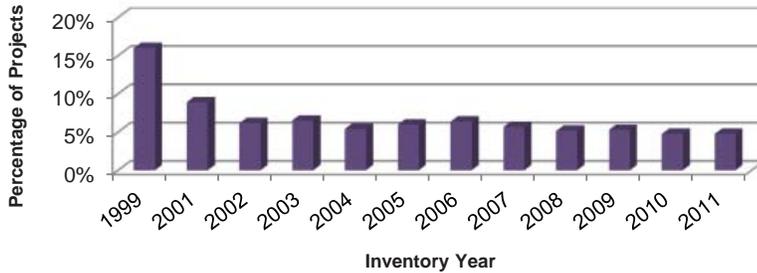


Table 6. Total Estimated Cost in Millions and Percent of Total of Needed Infrastructure Improvements by Project Type and Level of Government  
Five-year Period July 2011 through June 2016

Category and Type of Need	City		County		State		Federal		Joint		Other		Total	
	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total	Estimated Cost [in millions]	Percent of Total
<b>Transportation and Utilities</b>	<b>\$ 2,317.6</b>	<b>11.5%</b>	<b>\$ 1,772.6</b>	<b>8.8%</b>	<b>\$ 15,373.2</b>	<b>76.0%</b>	<b>\$ 300.0</b>	<b>1.5%</b>	<b>\$ 399.1</b>	<b>2.0%</b>	<b>\$ 58.2</b>	<b>0.3%</b>	<b>\$ 20,220.8</b>	<b>100.0%</b>
Transportation	2,222.9	11.1%	1,740.2	8.7%	15,373.2	76.8%	300.0	1.5%	393.1	2.0%	0.0	0.0%	20,029.4	100.0%
Other Utilities	87.6	50.9%	20.3	11.8%	0.0	0.0%	0.0	0.0%	6.0	3.5%	58.2	33.8%	172.1	100.0%
Telecommunications	7.1	36.8%	12.2	63.2%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	19.3	100.0%
<b>Education</b>	<b>\$ 690.6</b>	<b>9.6%</b>	<b>\$ 2,904.5</b>	<b>40.3%</b>	<b>\$ 3,598.9</b>	<b>49.9%</b>	<b>\$ 0.0</b>	<b>0.0%</b>	<b>\$ 0.0</b>	<b>0.0%</b>	<b>\$ 20.8</b>	<b>0.3%</b>	<b>\$ 7,214.8</b>	<b>100.0%</b>
Post-secondary Education & Preschools	1.7	0.0%	1.0	0.0%	3,543.0	99.9%	0.0	0.0%	0.0	0.0%	0.0	0.0%	3,545.7	100.0%
Existing School Improvements	541.9	27.2%	1,428.2	71.7%	0.0	0.0%	0.0	0.0%	0.0	0.0%	20.8	1.0%	1,991.0	100.0%
New Public Schools	133.8	8.3%	1,470.4	91.7%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1,604.1	100.0%
School System-wide	13.2	17.8%	4.9	6.6%	55.9	75.6%	0.0	0.0%	0.0	0.0%	0.0	0.0%	74.0	100.0%
<b>Health, Safety and Welfare</b>	<b>\$ 2,561.6</b>	<b>41.3%</b>	<b>\$ 1,501.0</b>	<b>24.2%</b>	<b>\$ 1,009.6</b>	<b>16.3%</b>	<b>\$ 0.0</b>	<b>0.0%</b>	<b>\$ 240.9</b>	<b>3.9%</b>	<b>\$ 885.4</b>	<b>14.3%</b>	<b>\$ 6,198.4</b>	<b>100.0%</b>
Water and Wastewater	1,983.7	48.3%	1,016.5	24.7%	0.0	0.0%	0.0	0.0%	225.0	5.5%	885.4	21.5%	4,110.5	100.0%
Law Enforcement	142.6	12.3%	386.2	33.4%	628.2	54.3%	0.0	0.0%	0.0	0.0%	0.0	0.0%	1,157.1	100.0%
Storm Water	276.5	96.7%	6.4	2.2%	0.0	0.0%	0.0	0.0%	3.0	1.1%	0.0	0.0%	286.0	100.0%
Public Health Facilities	1.6	0.4%	31.2	7.3%	381.3	89.5%	0.0	0.0%	12.0	2.8%	0.0	0.0%	426.2	100.0%
Fire Protection	134.8	79.1%	35.3	20.7%	0.0	0.0%	0.0	0.0%	0.3	0.2%	0.0	0.0%	170.4	100.0%
Solid Waste	8.0	23.8%	24.9	74.4%	0.0	0.0%	0.0	0.0%	0.6	1.8%	0.0	0.0%	33.5	100.0%
Housing	14.3	96.6%	0.5	3.4%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	14.8	100.0%
<b>Recreation and Culture</b>	<b>\$ 966.5</b>	<b>56.5%</b>	<b>\$ 366.5</b>	<b>21.4%</b>	<b>\$ 315.2</b>	<b>18.4%</b>	<b>\$ 0.2</b>	<b>0.0%</b>	<b>\$ 61.8</b>	<b>3.6%</b>	<b>\$ 0.3</b>	<b>0.0%</b>	<b>\$ 1,710.5</b>	<b>100.0%</b>
Recreation	523.3	55.5%	209.9	22.3%	152.5	16.2%	0.2	0.0%	56.6	6.0%	0.3	0.0%	942.9	100.0%
Community Development	340.2	74.8%	93.4	20.5%	16.3	3.6%	0.0	0.0%	5.1	1.1%	0.0	0.0%	455.1	100.0%
Libraries, Museums, and Historic Sites	103.0	33.0%	63.1	20.2%	146.4	46.9%	0.0	0.0%	0.0	0.0%	0.0	0.0%	312.5	100.0%
<b>Economic Development</b>	<b>\$ 121.9</b>	<b>10.0%</b>	<b>\$ 1,037.8</b>	<b>85.2%</b>	<b>\$ 0.2</b>	<b>0.0%</b>	<b>\$ 0.0</b>	<b>0.0%</b>	<b>\$ 41.3</b>	<b>3.4%</b>	<b>\$ 17.3</b>	<b>1.4%</b>	<b>\$ 1,218.5</b>	<b>100.0%</b>
Business District Development	78.4	8.1%	878.4	90.4%	0.0	0.0%	0.0	0.0%	14.4	1.5%	0.0	0.0%	971.3	100.0%
Industrial Sites and Parks	43.4	17.6%	159.4	64.5%	0.2	0.1%	0.0	0.0%	26.9	10.9%	17.3	7.0%	247.2	100.0%
<b>General Government</b>	<b>\$ 272.5</b>	<b>55.7%</b>	<b>\$ 85.0</b>	<b>17.4%</b>	<b>\$ 108.4</b>	<b>22.2%</b>	<b>\$ 20.0</b>	<b>4.1%</b>	<b>\$ 1.6</b>	<b>0.3%</b>	<b>\$ 1.4</b>	<b>0.3%</b>	<b>\$ 488.9</b>	<b>100.0%</b>
Public Buildings	195.0	49.5%	70.2	17.8%	107.2	27.2%	20.0	5.1%	0.0	0.0%	1.4	0.4%	393.9	100.0%
Other Facilities	77.5	81.5%	14.8	15.5%	1.2	1.2%	0.0	0.0%	1.6	1.7%	0.0	0.0%	95.0	100.0%
<b>Grand Total</b>	<b>\$ 6,930.6</b>	<b>18.7%</b>	<b>\$ 7,667.4</b>	<b>20.7%</b>	<b>\$ 20,405.5</b>	<b>55.1%</b>	<b>\$ 320.2</b>	<b>0.9%</b>	<b>\$ 744.7</b>	<b>2.0%</b>	<b>\$ 983.5</b>	<b>2.7%</b>	<b>\$ 37,051.9</b>	<b>100.0%</b>



**Figure 5. Percentage of Projects Affected by Mandates  
1999 through 2011\***



\*The percentage for 2000 was not available.

term trend in the number of projects affected by mandates has declined to flat. About 15% of projects reported in 2001 included costs related to mandates. The percentage fell to 9% the following year and remained around 5% from 2004 through 2009. See figure 5. Existing school improvements alone account for nearly two-thirds (62.4%) of the total number of projects affected by mandates. Increasing by 48 projects since the last inventory, existing schools

are far more likely to be affected by mandates than any other type of project. See table 8.

**Table 8. Percent of Projects Affected by Mandates  
Five-year Period July 2011 through June 2016**

Type of Need	Number of Projects or Schools Reported	Projects or Schools Affected by Mandates	
		Number	Percent
Existing School Improvements	1,294	271	20.9%
School System-wide	29	3	10.3%
Public Health Facilities	72	8	11.1%
Post-secondary Education and Preschools	500	43	8.6%
Law Enforcement	195	6	3.1%
Solid Waste	43	1	2.3%
Recreation	634	24	3.8%
Public Buildings	172	9	5.2%
New Public Schools	88	2	2.3%
Storm Water	66	1	1.5%
Water and Wastewater	1,297	26	2.0%
Libraries, Museums, and Historic Sites	90	2	2.2%
Community Development	90	2	2.2%
Transportation	4,213	36	0.9%
Fire Protection	112	0	0.0%
Housing	3	0	0.0%
Business District Development	32	0	0.0%
Industrial Sites and Parks	102	0	0.0%
Other Facilities	50	0	0.0%
Other Utilities	65	0	0.0%
Telecommunications	6	0	0.0%
<b>Grand Total</b>	<b>9,153</b>	<b>434</b>	<b>4.7%</b>

# Building Tennessee's Tomorrow:

## Anticipating the State's Infrastructure Needs

July 2011 through June 2016

### FUNDING THE STATE'S INFRASTRUCTURE NEEDS

***Nearly two-thirds of the funding needed for infrastructure in the current inventory is not yet available.***

Only 37% of the funds needed to pay for public infrastructure are currently available. The inventory does not include information about whether funding is available for the estimated \$7 billion worth of improvements at existing schools or for those drawn from the capital budget requests submitted by state agencies. Excluding the cost of that infrastructure from the \$37 billion total reported for the period covered by the inventory leaves \$30 billion in needs. Of that \$30 billion, only \$10.8 billion is fully funded. No funding is available for \$18.8 billion of that amount, but \$415 million is available for the \$4.5 billion worth of improvements that are partially funded. See tables 9 and 10.

Local officials report that \$11.2 billion is available to fund public infrastructure; of that amount \$10.8 billion is for infrastructure that is fully funded.

**Table 9. Summary of Funding Availability\***  
*Five-year Period July 2011 through June 2016*

	<b>Funding Available [in billions]</b>	<b>Funding Needed [in billions]</b>	<b>Total Needs [in billions]</b>
Fully Funded Needs	\$ 10.8	\$ 0	\$ 10.8
Partially Funded Needs	0.4	4.0	4.5
Unfunded Needs	0.0	14.8	14.8
<b>Total</b>	<b>\$ 11.2</b>	<b>\$ 18.8</b>	<b>\$ 30.0</b>

\*Excludes infrastructure improvements for which funding availability is not known.

The government that owns infrastructure typically funds the bulk of its cost. For example, local officials report that 91% of the funding for county-owned projects will come from county sources. The same is true of improvements reported in the 2007 inventory that have since been completed—counties paid 88% of the cost of meeting their infrastructure needs. Likewise, cities provided 67% of the funds necessary for improvements they needed in 2007 and have completed since then and expect to provide 76% of the funds for current and future improvements. Special districts paid 83% of the

**Table 10. Percent of Needs Fully Funded by Type of Need**  
*Five-year Period July 2011 through June 2016*

<b>Category and Project Type</b>	<b>Total Needs [in millions]</b>	<b>Fully Funded Needs [in millions]</b>	<b>Percent of Total Needs Fully Funded</b>
<b>Transportation and Utilities</b>	<b>\$ 20,168.7</b>	<b>\$ 6,464.3</b>	<b>32.1%</b>
Transportation	19,977.3	6,403.8	32.1%
Other Utilities	172.1	53.3	31.0%
Telecommunications	19.3	7.1	36.8%
<b>Health, Safety, and Welfare</b>	<b>\$ 5,189.9</b>	<b>\$ 2,375.5</b>	<b>45.8%</b>
Water and Wastewater	4,110.5	1,957.0	47.6%
Law Enforcement	529.8	126.6	23.9%
Storm Water	286.0	215.0	75.2%
Fire Protection	170.4	35.6	20.9%
Solid Waste	33.5	10.8	32.1%
Public Health Facilities	44.8	15.8	35.2%
Housing	14.8	14.8	100.0%
<b>Education</b>	<b>\$ 1,627.5</b>	<b>\$ 443.6</b>	<b>27.3%</b>
New Public Schools	1,604.1	440.8	27.5%
School System-wide	17.7	2.5	14.0%
Post-secondary Education and Preschools	5.7	0.3	5.7%
<b>Recreation &amp; Culture</b>	<b>\$ 1,431.1</b>	<b>\$ 422.5</b>	<b>29.5%</b>
Recreation	807.2	279.6	34.6%
Community Development	455.1	120.2	26.4%
Libraries, Museums, and Historic Sites	168.8	22.8	13.5%
<b>Economic Development</b>	<b>\$ 1,218.5</b>	<b>\$ 948.4</b>	<b>77.8%</b>
Business District Development	971.3	918.3	94.5%
Industrial Sites and Parks	247.2	30.1	12.2%
<b>General Government</b>	<b>\$ 387.9</b>	<b>\$ 140.4</b>	<b>36.2%</b>
Public Buildings	294.0	116.0	39.4%
Other Facilities	93.8	24.4	26.0%
<b>Grand Total</b>	<b>\$ 30,023.6</b>	<b>\$ 10,794.7</b>	<b>36.0%</b>

cost of meeting their 2007 infrastructure needs and expect to fund 64% of their current and future costs.

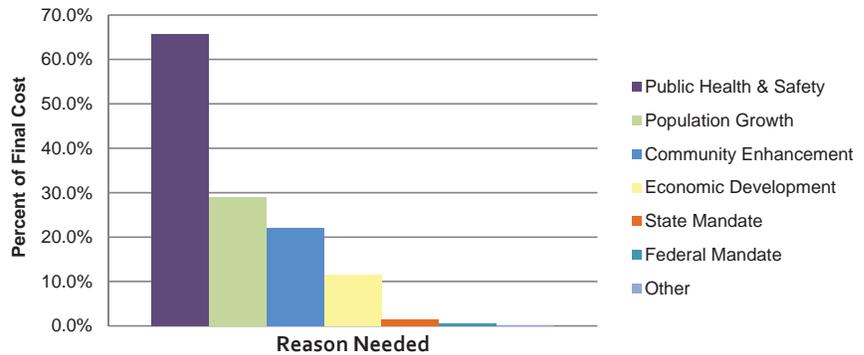
Infrastructure is built for many reasons, including community enhancement, population growth, public health and safety, economic development, and government mandates. Around two-thirds (67%) of improvements in this inventory are needed for public health and safety, 29% is needed for population growth, and 22% is needed for community enhancement. These figures add to more than 100% because there may be more than one reason for any particular project. These percentages are comparable to those for projects completed

since 2007: public health and safety (66%), population growth (29%), and community enhancement (22%). See figures 6 and 7. For information by type of infrastructure, see tables 12 and 13 on pages 32 and 33.

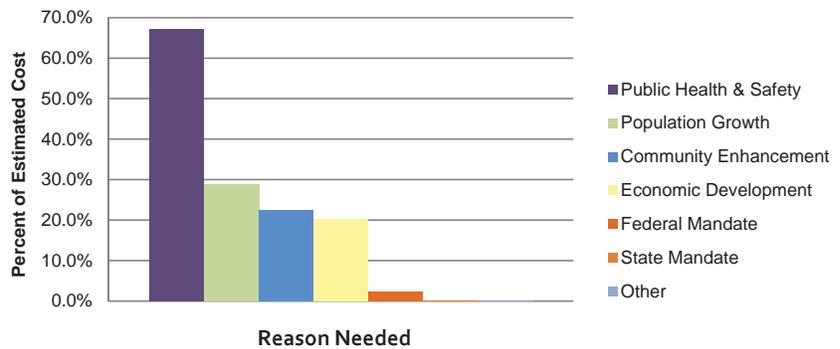
In some cases, government mandates ensure that necessary infrastructure is funded and completed. As noted in the first chapter, few projects are affected by mandates, but one type of infrastructure—public school buildings—is needed to meet Tennessee's constitutional requirement to provide a system of free public schools to all students.<sup>12</sup> That mandate places a requirement on the state to fund schools, which it does through the Basic Education Program (BEP) formula. That formula includes money for capital outlay—an amount that tops \$600 million each year, of which the state pays

around \$300 million. Although the state makes a substantial contribution to funding public schools, they are owned by local governments. Nearly half (47%) of the need reported in 2007 for new school buildings has already been met (see table 11). Schools completed between 2008 and 2011 were mainly funded by counties, which own 86.5% of this new public school infrastructure. Cities are the second largest owners of new public schools at 9.8%, and special school districts are third at 3.7%. Currently, local officials report that \$1.6 billion is needed for new public school infrastructure, of which \$440.8 million is fully funded. Although the state provides considerable funding for school capital outlay, it does not earmark those funds for that specific purpose. School systems have the flexibility to use those funds to meet various school needs and generally report using them for operating costs.

**Figure 6. Percent of Final Cost by Reason Needed**  
*July 2007 Needs Met by July 2011*



**Figure 7. Percent of Estimated Cost by Reason Needed**  
*July 2011 Needs*



<sup>12</sup> Article 11, Section 12 of the Tennessee State Constitution, recognizing the inherent value of education and encouraging its support, directs the General Assembly to provide for the maintenance, support and eligibility standards of a system of free public schools.

**Table 11. Percent of July 2007 Needs Completed by Type of Need**  
*Completed between July 2007 and July 2011*

Category and Type of Infrastructure	July 2007 Inventory	Total Completions	Completion Rate	Percent of Total
<b>Transportation and Utilities</b>	<b>\$ 17,592,831,367.0</b>	<b>\$ 2,957,602,311.0</b>	<b>16.8%</b>	<b>48.6%</b>
Transportation	16,998,484,901.0	2,523,130,708.0	14.8%	41.5%
Other Utilities	579,337,566.0	426,512,703.0	73.6%	7.0%
Telecommunications	15,008,900.0	7,958,900.0	53.0%	0.1%
<b>Education</b>	<b>\$ 1,943,468,489.0</b>	<b>\$ 886,209,468.0</b>	<b>45.6%</b>	<b>14.6%</b>
New Public Schools	1,873,370,189.0	880,629,168.0	47.0%	14.5%
Post-secondary Education and Preschools	40,668,300.0	5,580,300.0	13.7%	0.1%
School System-wide	29,430,000.0	0	0.0%	0.0%
<b>Health, Safety, and Welfare</b>	<b>\$ 5,456,628,317.0</b>	<b>\$ 1,631,987,886.0</b>	<b>29.9%</b>	<b>26.8%</b>
Water and Wastewater	3,939,756,978.0	1,108,626,880.0	28.1%	18.2%
Law Enforcement	771,416,847.0	337,152,300.0	43.7%	5.5%
Storm Water	362,544,347.0	60,959,577.0	16.8%	1.0%
Fire Protection	210,027,645.0	49,228,549.0	23.4%	0.8%
Housing	65,388,740.0	41,199,740.0	63.0%	0.7%
Public Health Facilities	57,253,836.0	17,964,916.0	31.4%	0.3%
Solid Waste	50,239,924.0	16,855,924.0	33.6%	0.3%
<b>Recreation and Culture</b>	<b>\$ 1,470,144,954.0</b>	<b>\$ 319,599,316.0</b>	<b>21.7%</b>	<b>5.3%</b>
Recreation	892,091,929.0	238,163,230.0	26.7%	3.9%
Community Development	420,308,235.0	25,349,580.0	6.0%	0.4%
Libraries, Museums, and Historic Sites	157,744,790.0	56,086,506.0	35.6%	0.9%
<b>Economic Development</b>	<b>\$ 544,667,051.0</b>	<b>\$ 101,805,931.0</b>	<b>18.7%</b>	<b>1.7%</b>
Business District Development	341,186,111.0	60,977,991.0	17.9%	1.0%
Industrial Sites and Parks	203,480,940.0	40,827,940.0	20.1%	0.7%
<b>General Government</b>	<b>\$ 522,118,350.0</b>	<b>\$ 188,958,512.0</b>	<b>36.2%</b>	<b>3.1%</b>
Public Buildings	461,573,990.0	150,946,152.0	32.7%	2.5%
Other Facilities	60,544,360.0	38,012,360.0	62.8%	0.6%
<b>Grand Total</b>	<b>\$ 27,529,858,528.0</b>	<b>\$ 6,086,163,424.0</b>	<b>22.1%</b>	<b>100.0%</b>

Population growth is the main reason given for new public school infrastructure, accounting for 96% of fully funded projects reported in the 2011 inventory, and is the reason behind 81% of new school infrastructure costs completed between 2008 and 2011. Public health and safety is the main reason given for transportation infrastructure, accounting for 75% of improvements in the 2011 inventory and for 76% of improvements made since 2007 (again, see table 11). Consequently, there are several dedicated funding mechanisms, including federal and state fuel tax and local wheel taxes, to help ensure that transportation infrastructure needs are met. These dedicated sources are under increased pressure, in part because rates have not been raised in several years—the federal gas tax rate has been set at 18.4 cents since 1993, and the Tennessee motor fuel tax on

gasoline has been set at 21.4 cents since 1990—and in part because of increased fuel efficiency and changing driving habits. Transportation accounts for 67% (\$20 billion) of the infrastructure costs and 32.1% of the improvements that are fully funded. Transportation also accounted for 41% of the total dollars spent on infrastructure needs reported in 2007 and since completed, even though only 14.8% of the transportation improvements needed in 2007 were completed by 2011. The majority of transportation infrastructure needs completed between the 2008 and 2011 inventories were state owned (68%), and of those state-owned projects, 68.6% of the funding came from their own sources and 25.6% of the funding was from federal sources. Local governments owned the remainder of the projects. Of the 18% reported as city owned, just 14.3% of the funding came from state sources, while 30% came from federal sources. A similar ratio is seen at the county level.

Water and wastewater infrastructure is needed to ensure clean drinking water and protect water supply sources. Consequently, public health and safety issues are the main reason given for 87% of the estimated cost of improvements reported in the 2011 inventory, as well as 88% of improvements completed between 2008 and 2011. The utilities that provide these services are required to be self-sustaining, funded mainly by user fees rather than through taxes, so that the amount each customer pays is in proportion to the amount that customer uses. Water and wastewater projects made up 18.2% (\$1.1 billion) of the total dollars needed for all 2007 projects completed since then and had a completion rate of 28.1%. Half of the water and wastewater infrastructure improvements completed since 2007 belong to cities, which paid for 72% of the cost of their improvements, and 17% of the improvements are owned by counties, which paid 90% of their costs. The remaining 32% is owned by utility districts, which paid 80% of the cost of their infrastructure improvements. Although they don't own any of this infrastructure, the state and federal governments contributed 19% of the funding necessary to complete it.

Storm water infrastructure is also necessary to protect our drinking water, as well as to control flooding, and the reason given most often for needing it is public health and safety (97%). Although the need for it grows as the amount of land covered by impervious surfaces (e.g., buildings, roads and streets, and parking lots) increases, population growth is rarely mentioned as a reason for needing it (0.2% of all storm water improvements in the current inventory and

Our nation's water infrastructure is too often out of sight, out of mind, and people only notice it when it fails to work.

Patrick J. Natale, American Society of Civil Engineers, *The Washington Post*, *Experts foresee more Frequent Water Disruptions around the Nation*, July 16, 2013.

3.9% of the 2007 improvements that have been completed). Counties provide some storm water infrastructure, but all of the fully funded improvements in the current inventory are owned by cities, and 94% of the cost is paid by cities. A total of \$286 million is needed for storm water infrastructure in the current inventory, of which \$215 million is available. Only 17% (\$61 million) of the storm water improvements needed in 2007 have been completed. Storm water infrastructure is primarily funded with general tax revenue and, to a lesser extent, with user fees.

Population growth is given as a reason for most (63%) other utility infrastructure—infrastructure owned by public gas and electric utilities—in the current inventory but for only 3% of the improvements completed since 2007. Similarly, community enhancement and economic development were each given as reasons for 44% of the improvements in the current inventory but only tiny percentages (0.5% and 1.5%) of improvements completed since 2007. Public health is given as a reason for around half (51%) of the improvements in the current inventory and nearly all (96%) of the improvements completed since 2007. Of the \$579 million worth of other utility infrastructure needs reported in 2007, 74% has been completed. A single project in Nashville, owned by the metropolitan government, accounts for around two-thirds of the 2007 total and 95% of the cost of improvements completed since then. All of the county costs, including those, were paid for by the counties themselves, mainly from user fees. Cities own just 5% of other utility infrastructure and paid 97% of their cost.

Public health and safety is the main reason given for all fire protection infrastructure, but population growth is also given as a reason for 27% of it. Although community enhancement is given as a reason for only 4.6% of the fire protection improvements in the current inventory, it is given as a reason for nearly 20% of improvements completed since 2007. Local officials report that \$170.4 million is needed for the fire protection infrastructure in the current inventory and that around one-fifth of that cost (\$35.6 million) is funded. Only 23% (\$49 million) of the fire protection infrastructure needed in 2007 has been completed. Over half (58%) of fire protection infrastructure improvements completed since 2007 belong to cities, which paid 89% of the cost of their improvements, and 42% of the improvements are owned by counties, which paid 96% of their costs.

As with fire protection, public health and safety is the main reason given for all law enforcement infrastructure. Population growth is also given as a reason for 32% of law enforcement infrastructure. Community enhancement is given as a reason for about a quarter of the law enforcement improvements in the current inventory and about 14% of improvements completed since 2007. Local officials report that \$530 million is needed for the law enforcement infrastructure in the current inventory and that \$127 million of this cost is funded. Approximately 44% (\$337 million) of the law enforcement infrastructure needed in 2007 has been completed. Counties own 86% of the law enforcement infrastructure improvements made since 2007 and paid nearly all the cost of that infrastructure; 14% is owned by cities, which paid 100% of their costs. Like fire protection infrastructure, law enforcement infrastructure is funded with general tax revenue.

Public buildings, including mainly county courthouses, county offices, city halls, and public works offices, serve a variety of purposes and are needed for many reasons. The public building improvements in the current inventory are needed largely for community enhancement (52%) and public health and safety (45%) but also for population growth (37%). A very small percentage (7%) is needed for economic development. Improvements that have been completed since 2007 were needed mainly for public health and safety (49%) but also for community enhancement (32%) and economic development (30%), and to a lesser extent for population growth (21%). About \$294 million is needed for public building infrastructure in the current inventory, and \$116 million of this cost is funded, mostly with general tax revenue. One-third (\$151 million) of the public building improvements needed in 2007 have been completed. Approximately 70% of those belong to counties, which paid nearly their entire cost, and 28% of them are owned by cities, which paid 86% of their cost.

Community enhancement is the reason given most often (95%) for business district development infrastructure in the current inventory but only for 36% of the improvements completed since 2007. Not surprisingly, economic development is often the reason for needing this type of infrastructure (82% in the current inventory and 65% for those improvements completed since 2007). While population growth is listed as a reason for only 1% of the business district improvements in the current inventory, it is listed as a reason for over half (56%) of those completed since 2007. Of the \$971 million needed for business district infrastructure in the current inventory, \$918 million (95%) is

In a world suffering unprecedented economic and environmental challenges, the importance of infrastructure is being recognized by populations and politicians alike. The long-term issue of funding (who pays?) and the shorter-term options for financing of infrastructure (how do we pay?) are becoming hugely important questions for policy makers and the government officials responsible for creating and maintaining the assets that enable 21<sup>st</sup>-century cities to function.

Jonathan D. Miller, Urban Land Institute and Ernst & Young, *Infrastructure 2013: Global Priorities, Global Insights*, 2013.

funded and nearly all of it belongs to counties. Most of this is for the new convention center and the adjacent art district redevelopment area in Nashville, which together cost an estimated \$854 million and are included as county infrastructure because they are owned by a metropolitan government. Almost 18% (\$61 million) of the business district infrastructure needed in 2007 has been completed. Nearly all (96%) of the \$61 million worth of business district infrastructure improvements completed since 2007 belong to counties, which paid 63% of the cost of their improvements. More than half of this belongs to Metropolitan Nashville and Davidson County. Most of the remainder of county costs (33%) was funded by the federal government.

Economic development is the main reason for nearly all industrial site and park infrastructure (97% of improvements in the current inventory and 98% of those completed). Community enhancement and population growth are reasons given for 16% and 14% of industrial sites and parks in the current inventory. Community enhancement was given as a reason for only 7% of industrial site and park improvements completed since 2007; population growth was not given as a reason for any of this new infrastructure. These projects can be complex with multiple components, such as roads, rail spurs, ports, and utilities that are classified as other types of infrastructure (e.g., transportation, water and wastewater) and have different funding sources. Rail spurs and ports are typically funded with state or federal grants; utilities are typically funded with user fees. Only 12% (\$30 million) of the \$248 million needed for industrial site and park infrastructure in the current inventory is fully funded. Slightly over 20% (\$41 million) of the industrial site and park improvements needed in 2007 have been completed. Approximately 64% of industrial site and park improvements completed since 2007 belong to counties, which paid 54% of the cost of their improvements. Federal and state sources, such as the state departments of transportation and of economic and community development, paid 42% of the cost of the improvements. About 25% of the improvements are owned by cities, which paid 54% of their costs. The state paid about a quarter of the costs of these, and special districts paid 15% of their cost, mainly for water or wastewater infrastructure.

Community enhancement is the reason given for nearly all (97%) new recreation infrastructure in the current inventory and for most (92%) improvements completed since 2007. About \$280 million (35%) of the \$807 million worth of recreation infrastructure is fully funded, mainly

by general tax revenue. About 27% (\$238 million) of the recreation improvements needed in 2007 have been completed. When looking at the 2007 completions, 57% were owned by cities and 37% were county owned. The bulk of the cost of recreation infrastructure is paid for by the government that owns it. Cities paid 66% of their costs and counties paid 77% of theirs. The rest of the funding came from state and federal agencies, with federal agencies paying 21% of the cost of city-owned improvements and 14% of the cost of county-owned improvements. The state paid the other 10% for cities and 7% for counties.

The current inventory includes only three housing projects, all of which are under construction and fully funded. Community enhancement is given as a reason for all three of these projects, and economic development is given for the one in Memphis, which accounts for close to 95% of the total cost of all housing in the current inventory. Community enhancement was the main reason for nearly all (99%) of the housing project improvements made since 2007. Population growth, public health and safety, and economic development were reasons for 13%, 11%, and 10% of those improvements. Of the \$63 million housing improvement needs reported in 2007, 63% has been completed. Cities own 62% of this housing and paid 47% of their cost; federal and private grants shared the rest of the cost about equally. Counties paid nearly all (99%) of the cost of their housing improvements, which accounted for the remaining 38% of this public infrastructure.

**Table 12. Reason Given for Needing Infrastructure Improvements in the Current Inventory**  
*Five-year Period July 2011 through June 2016*

Category and Type of Infrastructure	July 2011 Estimated Cost	Reason for Infrastructure Need					
		Public Health and Safety	Population Growth	Community Enhancement	Economic Development	Federal and State Mandates	Other Reasons
<b>Transportation and Utilities</b>	<b>\$ 20,168,721,127</b>	<b>75.2%</b>	<b>26.0%</b>	<b>14.1%</b>	<b>21.3%</b>	<b>0.2%</b>	<b>0.0%</b>
Transportation	19,977,290,418	75.4%	25.7%	13.9%	21.1%	0.2%	0.0%
Other Utilities	172,130,709	51.4%	62.9%	44.2%	43.5%	0.0%	0.0%
Telecommunications	19,300,000	74.1%	2.1%	2.1%	29.5%	0.0%	0.0%
<b>Education</b>	<b>\$ 1,627,521,073</b>	<b>4.6%</b>	<b>94.8%</b>	<b>6.0%</b>	<b>1.9%</b>	<b>2.0%</b>	<b>0.0%</b>
Post-secondary Education and Preschools	5,701,750	5.3%	27.9%	14.1%	61.0%	0.0%	0.0%
New Public Schools	1,604,136,323	4.3%	96.0%	5.2%	1.7%	2.0%	0.0%
School System-wide	17,683,000	35.4%	5.3%	73.9%	0.0%	0.0%	0.0%
<b>Health, Safety, and Welfare</b>	<b>\$ 5,189,865,435</b>	<b>88.8%</b>	<b>31.4%</b>	<b>23.6%</b>	<b>8.4%</b>	<b>11.6%</b>	<b>0.6%</b>
Water and Wastewater	4,110,530,025	86.5%	34.4%	24.9%	9.7%	14.5%	0.7%
Law Enforcement	529,822,655	100.0%	28.9%	24.5%	0.1%	0.0%	0.0%
Public Health Facilities	44,829,800	100.0%	1.9%	7.0%	2.2%	0.6%	0.0%
Storm Water	285,963,178	97.1%	0.2%	12.9%	7.0%	0.0%	0.0%
Fire Protection	170,401,678	100.0%	27.0%	4.6%	0.9%	0.0%	0.0%
Solid Waste	33,518,099	81.6%	41.1%	25.2%	5.9%	11.9%	0.0%
Housing	14,800,000	0.0%	0.0%	100.0%	94.6%	0.0%	0.0%
<b>Recreation and Culture</b>	<b>\$ 1,431,064,719</b>	<b>13.5%</b>	<b>7.1%</b>	<b>95.3%</b>	<b>16.7%</b>	<b>2.7%</b>	<b>0.0%</b>
Recreation	807,196,069	18.7%	6.5%	96.7%	6.3%	4.6%	0.0%
Community Development	455,078,856	8.7%	6.4%	93.0%	35.9%	0.2%	0.0%
Libraries, Museums, and Historic Sites	168,789,794	1.7%	11.6%	94.7%	14.7%	0.1%	0.0%
<b>Economic Development</b>	<b>\$ 1,218,490,633</b>	<b>0.4%</b>	<b>3.4%</b>	<b>79.5%</b>	<b>85.8%</b>	<b>0.0%</b>	<b>0.0%</b>
Business District Development	971,260,620	0.0%	0.9%	95.6%	82.3%	0.0%	0.0%
Industrial Sites and Parks	247,230,013	1.9%	13.5%	16.3%	99.6%	0.0%	0.0%
<b>General Government</b>	<b>\$ 387,888,785</b>	<b>40.5%</b>	<b>29.5%</b>	<b>58.4%</b>	<b>5.4%</b>	<b>2.9%</b>	<b>0.0%</b>
Public Buildings	294,042,785	45.0%	37.4%	52.4%	7.2%	3.9%	0.0%
Other Facilities	93,846,000	26.6%	5.0%	77.0%	0.0%	0.0%	0.1%
<b>Grand Total</b>	<b>\$ 30,023,551,772</b>	<b>67.3%</b>	<b>28.9%</b>	<b>22.4%</b>	<b>20.2%</b>	<b>2.4%</b>	<b>0.1%</b>

**Table 13. Reason Given for Needing Infrastructure Improvements Completed Since 2007**  
*Infrastructure Needs Reported July 1, 2007 and Completed by July 1, 2011*

Category and Type of Infrastructure	July 2007 Completions 2008-11	Reason for Infrastructure Need					
		Public Health and Safety	Population Growth	Community Enhancement	Economic Development	Federal and State Mandates	Other Reasons
<b>Transportation &amp; Utilities</b>	<b>\$ 2,957,602,311</b>	<b>78.9%</b>	<b>15.5%</b>	<b>17.0%</b>	<b>15.9%</b>	<b>0.1%</b>	<b>0.0%</b>
Transportation	2,523,130,708	75.9%	17.7%	19.8%	18.3%	0.1%	0.0%
Other Utilities	426,512,703	96.3%	3.3%	0.4%	1.5%	0.0%	0.0%
Telecommunications	7,958,900	88.7%	0.0%	0.0%	11.3%	0.0%	0.0%
<b>Education</b>	<b>\$ 886,209,468</b>	<b>10.0%</b>	<b>81.1%</b>	<b>28.2%</b>	<b>2.3%</b>	<b>5.9%</b>	<b>0.8%</b>
Post-secondary Education & Preschools	5,580,300	5.0%	52.0%	69.9%	52.0%	0.0%	0.0%
New Public Schools	880,629,168	10.0%	81.3%	27.9%	2.0%	5.9%	0.9%
School System-wide	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
<b>Health, Safety and Welfare</b>	<b>\$ 1,631,987,886</b>	<b>88.9%</b>	<b>27.5%</b>	<b>13.9%</b>	<b>4.5%</b>	<b>3.4%</b>	<b>0.2%</b>
Water and Wastewater	1,108,626,880	87.7%	28.6%	10.9%	6.1%	2.6%	0.1%
Law Enforcement	337,152,300	100.0%	32.1%	14.2%	0.0%	7.1%	0.0%
Public Health Facilities	17,964,916	100.0%	1.9%	0.0%	0.0%	0.0%	0.0%
Storm Water	60,959,577	96.9%	3.9%	6.4%	3.1%	0.4%	3.1%
Fire Protection	49,228,549	100.0%	26.6%	19.6%	0.2%	4.3%	0.0%
Solid Waste	16,855,924	63.3%	15.2%	25.5%	3.7%	0.0%	0.0%
Housing	41,199,740	10.9%	12.6%	98.8%	9.7%	0.0%	0.0%
<b>Recreation and Culture</b>	<b>\$ 319,599,316</b>	<b>15.6%</b>	<b>11.4%</b>	<b>91.1%</b>	<b>6.4%</b>	<b>0.7%</b>	<b>0.0%</b>
Recreation	238,163,230	19.4%	11.0%	91.7%	2.2%	0.9%	0.0%
Community Development	25,349,580	15.2%	0.8%	90.7%	48.5%	0.0%	0.0%
Libraries, Museums, and Historic Sites	56,086,506	0.0%	18.0%	88.9%	4.8%	0.0%	0.0%
<b>Economic Development</b>	<b>\$ 101,805,931</b>	<b>2.9%</b>	<b>33.5%</b>	<b>24.3%</b>	<b>78.2%</b>	<b>0.0%</b>	<b>0.0%</b>
Business District Development	60,977,991	0.0%	55.9%	35.7%	64.9%	0.0%	0.0%
Industrial Sites and Parks	40,827,940	7.3%	0.0%	7.2%	98.0%	0.0%	0.0%
<b>General Government</b>	<b>\$ 188,958,512</b>	<b>41.1%</b>	<b>35.5%</b>	<b>26.4%</b>	<b>23.9%</b>	<b>5.3%</b>	<b>0.0%</b>
Public Buildings	150,946,152	49.4%	21.4%	31.9%	30.0%	6.6%	0.0%
Other Facilities	38,012,360	8.1%	91.5%	4.7%	0.0%	0.0%	0.0%
<b>Grand Total</b>	<b>\$ 6,086,163,424</b>	<b>65.8%</b>	<b>29.0%</b>	<b>22.1%</b>	<b>11.6%</b>	<b>2.0%</b>	<b>0.2%</b>



# Building Tennessee's Tomorrow:

## Anticipating the State's Infrastructure Needs

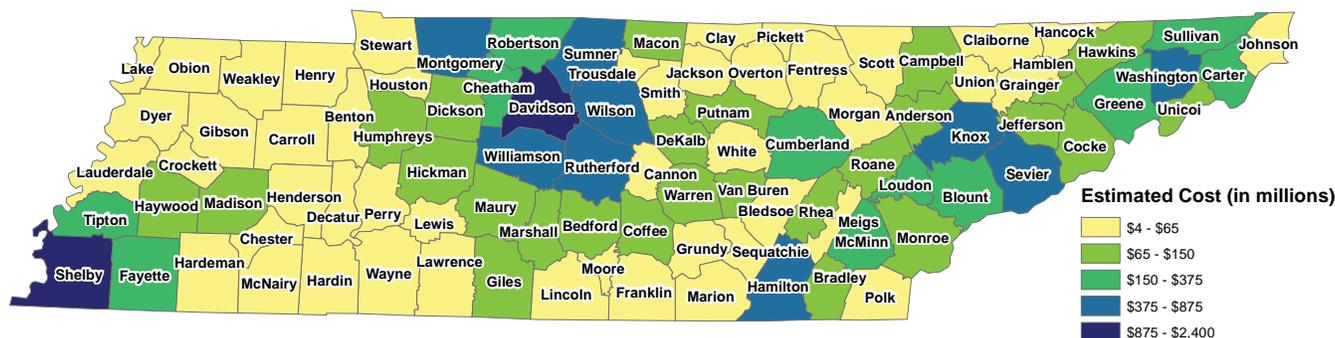
July 2011 through June 2016

### INFRASTRUCTURE NEEDS BY COUNTY

#### *Infrastructure needs vary widely across Tennessee's counties.*

Public Infrastructure needs and the ability to meet them vary across Tennessee. It is no surprise that counties with the largest populations, growth rates, and tax bases need the most infrastructure and are able to build the most. Davidson County, with the greatest density and second largest population, gets the most done, while Shelby, with the largest population, needs the most. Knox needs more than most and relatively speaking gets even more done, as do Rutherford, and Williamson Counties. Other populous counties—Hamilton, Montgomery, Sevier, Sullivan, Sumner, Washington, and Wilson Counties—need more than most and build more than the rest of the state. Madison, having a relatively large population, is the exception; it has less than average needs and gets less done. See maps 1 and 2.

**Map 1. Estimated Cost of Total Infrastructure Needs**  
*Five Year Period July 2011 through June 2016*



**Map 2. Estimated Cost of Completed Infrastructure Needs**  
*Infrastructure Needs Reported July 1, 2007, and Completed by July 1, 2011*

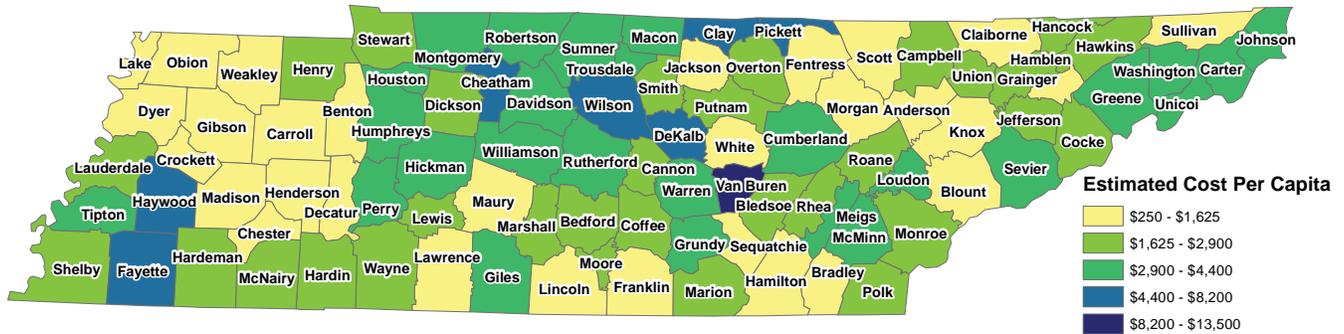


It is not clear from looking at these maps what is driving infrastructure needs in Madison County and the other 82 counties. For example, Cheatham, Tipton, and Fayette need an average amount of infrastructure but complete much less than average. In contrast, Lawrence needs little but falls near the middle for meeting its needs.

As with last year's report, staff looked at public infrastructure needs relative to population to gain insight into differences in needed and completed infrastructure among counties. The results might seem surprising. Even though the most populous counties need and complete more infrastructure, an examination of infrastructure improvements per capita indicates that population alone does not explain the differences. For instance, the most populous counties do not need the most infrastructure per capita and do not necessarily get the most done. In fact, the smallest counties may have the greatest need per capita and, as those needs are met, the largest infrastructure costs per capita.

The state's smallest county, Pickett, with a population of only 5,100, has needed a new high school for seven years now, estimated to cost a relatively modest \$15 million. The state's second smallest county, Van Buren, with a population of only 5,628, needs \$25 million to install and replace water lines. Projects of this size would not be significant in counties with large populations like Shelby or Davidson, but they are big enough to cause these small counties to have the largest infrastructure needs per capita. Van Buren is first, and Pickett is second. See map 3.

**Map 3. Estimated Cost of Total Infrastructure Needs Per Capita**  
*Five-year Period July 2011 through June 2016*



**Map 4. Estimated Cost of Completed Infrastructure Needs Per Capita**  
*Infrastructure Needs Reported July 1, 2007, and Completed by July 1, 2011*



The same effect can be found when looking at completed infrastructure per capita. Unicoi ranks 71st in population but has the second highest completed infrastructure per capita, largely because of the completion of the new \$15.6 million Unicoi Middle School in 2010. If not for this project, Unicoi would have ranked 20th for completed infrastructure per capita. See map 4.

**Financial resource factors are strongly tied to infrastructure needs and the ability to meet them.**

So what factors other than population might explain the variation in needed and completed infrastructure among counties? Likely candidates include financial resources, population gain, and population growth rates. Financial resources in the case of public infrastructure means revenue sources for local governments and residents' ability to pay taxes based on their income. Staff used a simple statistical method called correlation analysis to measure the strength of the relationship between each of these factors, as well as population, and needed infrastructure and between each and completed infrastructure. This analysis can suggest explanations for things that general observation cannot. The strength of the relationship in a correlation is reported as a range from zero to one, with zero indicating no relationship and one indicating the closest possible relationship. The coefficient will be positive if one set of numbers increases as the other increases, or decreases as the other decreases; it will be negative if one increases as the other decreases. Because Tennessee's 95 counties vary so much in size—for instance, "Big Shelby" at 755 square miles, is almost seven times the size of Trousdale, which is only 114 square miles—staff divided each of the factors by square miles to make sure that land area did not distort the analysis.

**Table 14. Correlation Between Needed Infrastructure and Related Factors Divided by Land Area**

Factor per square mile	Correlation with reported needs per square mile
Income	0.94
Taxable Property	0.93
Population	0.92
Taxable Sales	0.91
Population Gain or Loss	0.90
Pop Growth Rate	0.48

**Table 15. Correlation Between Completed Infrastructure Needs and Related Factors Divided by Land Area**

Factor per square mile	Correlation with completed needs per square mile
Taxable Property	0.91
Taxable Sales	0.91
Income	0.89
Population	0.85
Population Gain or Loss	0.63
Pop Growth Rate	0.40

Both the need for infrastructure and infrastructure that has been completed are closely related to financial resources and population. Infrastructure that is still needed is also highly correlated with population gain, but completed infrastructure is only weakly correlated with that factor. Both needed and completed infrastructure are weakly correlated with population growth rate. These results are

similar to last year's analysis of the same factors except that the correlation between population gain and completed infrastructure is weaker (.63 this year versus .83 last year). See tables 14 and 15.

Staff used another common statistical technique, regression analysis, to look at how well the factors as a group explain differences among counties in needed infrastructure projects and the ability to meet them. The regression analysis indicated that the factors are sound, with their combined effect explaining 90% of the difference among counties' reported infrastructure needs and 95% of the difference for their completed infrastructure.

# Building Tennessee's Tomorrow:

## Anticipating the State's Infrastructure Needs

July 2011 through June 2016

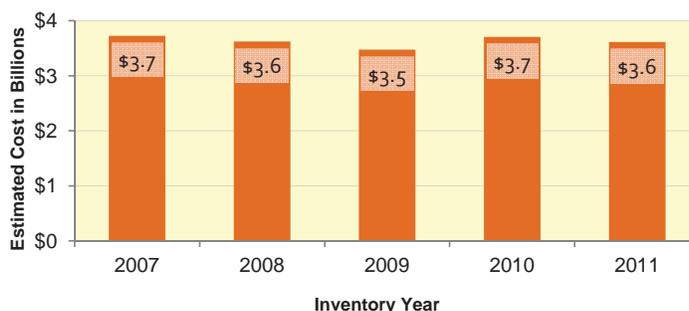
### ESTIMATED COST OF NEEDED PUBLIC SCHOOL BUILDING IMPROVEMENTS HAS PLATEAUED

Tennessee's public school systems need \$3.6 billion for infrastructure improvements that need to be in some stage of development during the five-year period of July 2011 through June 2016, a decrease of close to \$92 million (2.5%) since the previous inventory. These costs have been relatively flat since 2007 except for a slight dip in 2009. See figure 8. While the total cost of school infrastructure has been flat, there has been a shift from adding new space to renovating existing space in Tennessee's schools (see figure 9). This shift is partly the result of slowing enrollment.

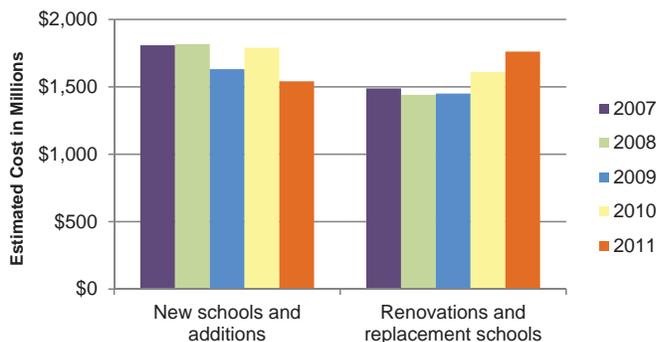
Enrollment growth began to slow in 2007, coinciding with the economic downturn, and remains low. With this shift, local officials are reporting higher costs to renovate or replace existing schools. Improvements in existing facilities are typically related to the condition of schools, which is better overall now than it was in the initial years of this inventory. However, even schools in good or better condition can have significant needs, with parts of the school requiring renovation or replacement.

Costs for improvements needed for things such as bus garages and central office buildings, which serve entire school systems, have been on a downward trend since 2009 and have decreased by around \$6.5 million (26.6%) this year (see table 16) because of a single project that was canceled—a new central office in Williamson County costing \$8 million.

**Figure 8. Total School Infrastructure Needs**  
July 2007, 2008, 2009, 2010, and 2011 Inventories



**Figure 9. Five Year Summary**  
July 2007, 2008, 2009, 2010, and 2011 Inventories



**Table 16. Change in School Infrastructure Needs by Type of Need**  
*July 2010 Inventory Compared to July 2011 Inventory*

Type of Need	July 2010 Inventory	July 2011 Inventory	Difference	Percent Change
<b>New School Space</b>	<b>\$ 1,790,001,460</b>	<b>\$ 1,540,531,275</b>	<b>\$ (249,470,185)</b>	<b>-13.9%</b>
New Schools	1,400,421,981	1,249,720,923	(150,701,058)	-10.8%
Additions	389,579,479	290,810,352	(98,769,127)	-25.4%
<b>Improvements to Existing Schools</b>	<b>\$ 1,890,279,006</b>	<b>\$ 2,054,576,181</b>	<b>\$ 164,297,175</b>	<b>8.7%</b>
Renovations	1,310,850,359	1,406,566,588	95,716,229	7.3%
Replacement Schools	298,200,446	354,415,400	56,214,954	18.9%
Technology	178,788,288	168,066,477	(10,721,811)	-6.0%
Mandates	102,439,913	125,527,716	23,087,803	22.5%
<b>System-wide Needs</b>	<b>\$ 24,632,000</b>	<b>\$ 18,083,000</b>	<b>\$ (6,549,000)</b>	<b>-26.6%</b>
<b>Statewide Total</b>	<b>\$ 3,704,912,466</b>	<b>\$ 3,613,190,456</b>	<b>\$ (91,722,010)</b>	<b>-2.5%</b>

***The need for new public schools and additions is declining.***

Local officials reported needing \$151 million less for new schools this year than last, in part because the cost of schools that were added to the inventory was more than offset by the cost of schools that were completed, canceled, reduced in size or scope, or were reclassified as replacement schools. Nineteen new school projects totaling \$295 million were added to the inventory, while cancellations, completions, and other reductions in cost totaled \$445 million. The canceled schools include one in Montgomery County (\$39 million), first proposed in 2007, and another in Jefferson County (\$40 million), initially reported in 2004. Completions include seven new schools finished in 2011 with a final cost of \$142 million.

Likewise, the estimated cost for additions to existing schools decreased by \$99 million. Additions totalling \$54 million were added by local officials, half of which is for eight schools in Davidson County (\$27 million). The total increase was more than offset by \$152 million in completed or canceled additions. A third of the decrease is the result of additions that were completed; the other two-thirds is from additions that were canceled. For example, Maryville, in Blount County, canceled a \$47 million addition at Maryville High School, planning instead to reconfigure grade groupings at existing schools. Maryville has had only a 14.6% increase in its student population in ten years (630 students).

Another fourteen systems reported additions to existing schools, with the types of additions needed varying in design to meet the specific needs of each school system's student population. Williamson County needs new auditoriums at six schools at a total cost of \$7.8 million, and Jefferson County needs \$5.4 million for four classrooms each at Dandridge and Jefferson Elementary schools, a new auditorium at the high school, and a gym at the middle school. Gibson Special School District needs ten new classrooms at South Gibson County High School at a cost of \$2 million and an additional administrative support facility for Kenton Elementary School at a cost of \$1 million. The remaining systems include both large and small systems with needs totaling less than \$3 million.

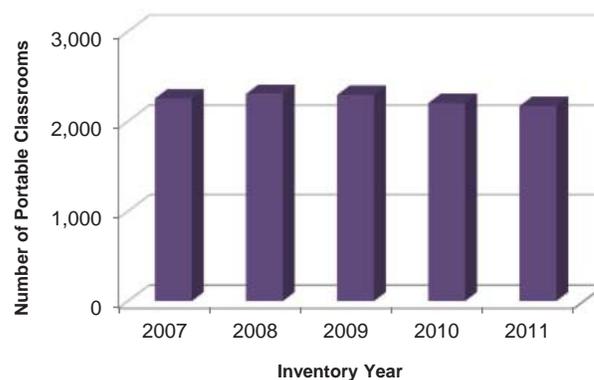
### ***The use of portables has declined slightly as enrollment growth has flattened out.***

The number of portable classrooms used by school systems in 2011 declined by 135 since the 2007 inventory, with decreases offsetting a small increase in the 2008 inventory (see figure 10). School systems use portables to deal with unanticipated space shortages, such as those caused by a natural disaster, and to provide temporary classroom space for large influxes of new students while they plan more permanent solutions. Williamson County is a good example of a system that used additional portables as a temporary solution while they were building new schools. In 2007, they used 21 portable classrooms, then increased the number to 61 in 2009 pending construction of five new schools, and then reduced the number to 22 in 2011 when the schools were completed.

As indicated in figure 10, this year's total of 2,173 portable classrooms (3.1% of all classrooms) is 33 less than last year's. As illustrated in map 5, which sums system-level information on portables to the county level, most counties (69 of 95) rely on portables for 3.5% or less of their total classroom space. Information on each school system's portables can be found in appendix E-7.

Twenty-two school systems used more portables in 2011 than in 2007. While most school systems added only a few, three added more

**Figure 10. Number of Portable Classrooms**  
Inventory Years 2007 through 2011





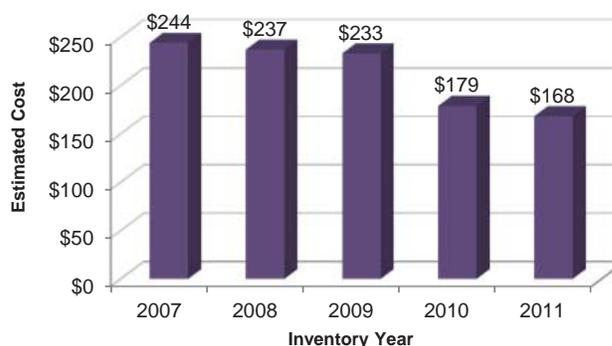
Not every system uses portables. The number of systems not using them has increased from 42 in 2007 to 45 in 2011. Three systems that had portable classrooms in 2007 no longer do—Athens, Manchester, and Moore County. This appears to be because of slow growing or shrinking enrollment. Student populations in Moore County and Manchester increased only slightly during this period—11 and 75 students. Athens' student population decreased by 123 students. Since 2007, enrollment also decreased in 27 of the other 41 systems without portables.

***The need for improvements in existing school buildings is increasing.***

The estimated cost of improving existing schools increased by over \$164 million since the last report. Improvements in existing school buildings include renovations, and replacements, technology upgrades, and changes prompted by state or federal facility mandates. The increased cost for existing school infrastructure is mostly driven by renovations and replacements, which is in turn driven by the condition of the schools. The cost of meeting mandates has fluctuated over the years, but it remains a relatively small percentage of total improvement costs. Since the last inventory, these costs rose from \$102.4 million to \$125.5 million, an increase of 22.5%. See table 16 .

The cost to improve technology infrastructure such as wiring, new computer labs, and security systems, which has declined steadily since 2007, declined another \$10.7 million (6%) since the last inventory and now stands at \$168.1 million. Technology upgrades are now at their lowest level since the infrastructure inventory began and are about 23% of their \$716 million peak in 2002. See figure 11. Technology is becoming less expensive every year, so schools are getting more for less when they upgrade equipment. Changes in technology may bring further decreases in infrastructure costs, especially if schools begin to rely on wireless or satellite access, which may mean higher operating costs but require less infrastructure spending. Technology infrastructure for new schools is included in their overall cost rather than in these figures.

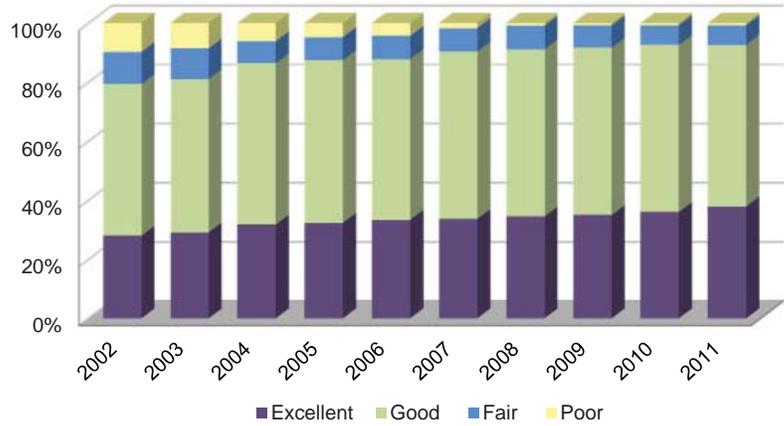
**Figure 11. Estimated Cost of Technology Infrastructure in Millions**  
July 2007 through July 2011



**The number of schools in good or excellent condition remains high.**

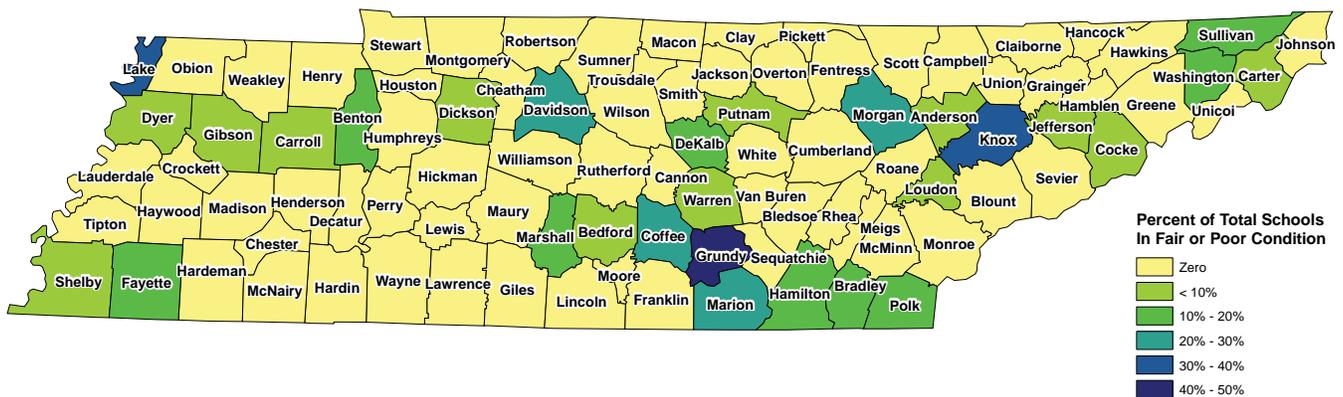
For each inventory, school systems rate the overall condition of their school buildings as well as the condition of each building component. As figure 12 shows, the number of Tennessee's public school buildings in good or better condition has been high for several years, and a very small percentage are in fair or poor condition.<sup>13</sup> The number of school buildings in excellent condition increased from 629 in the 2010 inventory to 666, and the number rated good decreased from 988 to 959. The number in fair or

**Figure 12. Overall Condition of Public School Buildings**  
2002 through 2011



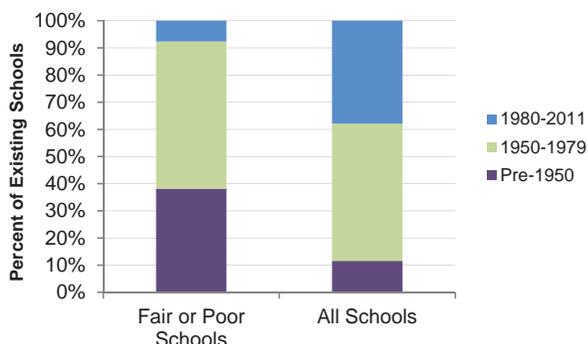
poor condition (131) remained the same as in last year's inventory and is 7% of the total. Most of these schools have been in fair or poor condition for some time. And as indicated in map 6, they are primarily clustered in a relatively small number of counties. Most schools in fair or poor condition are in urban areas, but some rural areas have higher percentages of schools in fair or poor condition. Nearly half of the schools in fair or poor condition (65) are in just two school systems: Davidson County and Knox County. Only three systems report half or more of their schools in fair or poor condition—Coffee County, Grundy County, and Bristol City Schools. Coffee County has the largest percentage of schools in less than good condition at 55.6%.

**Map 6. Percent of School Buildings in Fair or Poor Condition by County**  
July 2010 Inventory Compared to July 2011 Inventory



<sup>13</sup> These condition ratings are defined in appendix C.

**Figure 13. Fair or Poor Schools vs. All Schools by Year Built**



Not surprisingly, older schools are more likely to be in poorer condition. More than half of the public school buildings in use today were built in the 1950s, 1960s, and 1970s when the Baby Boom generation was making its way through school. And about half of the schools in fair or worse condition today were built during that period. Only 12% of schools in use today were built before 1950, but 37% of school buildings rated fair or poor date back to that period. By contrast, 38% of all schools were built in 1980 or later, and only 7% of those in fair or poor condition were built since then. See figure 13.

School systems have two choices to address those schools rated fair or poor—renovate them or replace them. The same choices apply to those schools as they get older and need more than basic maintenance. The cost to renovate or replace all schools in less than good condition is nearly \$575 million (32.6%). See table 17.

**Table 17. Renovation and Replacement Costs for the Ten Systems with the Highest Number of Schools in Fair or Poor Condition**  
Five-year Period July 2011 through June 2016

School System	All Schools		Schools in Fair or Poor Condition			
	Number of Schools	Estimated Cost to Renovate and Replace	Number of Schools	Percent Fair/Poor	Estimated Cost to Renovate and Replace	Percent of Total Need
Knox County	88	\$ 92,853,984	35	39.8%	\$ 60,475,911	65.1%
Davidson County	136	408,294,000	30	22.1%	177,047,000	43.4%
Hamilton County	74	28,075,500	11	14.9%	20,598,000	73.4%
Coffee County	9	64,093,000	5	55.6%	63,706,000	99.4%
Bradley County	18	13,245,000	4	22.2%	6,345,000	47.9%
Grundy County	8	6,765,000	4	50.0%	6,015,000	88.9%
Memphis City	190	226,717,021	4	2.1%	1,464,000	0.6%
Bristol City	7	39,257,000	4	57.1%	38,257,000	97.5%
Marion County	10	10,185,000	3	30.0%	10,005,000	98.2%
Sullivan County	25	22,415,000	3	12.0%	610,000	2.7%
<b>Subtotal</b>	<b>565</b>	<b>\$ 911,900,505</b>	<b>103</b>	<b>18.0%</b>	<b>\$ 384,522,911</b>	<b>42.2%</b>
<b>All Others</b>	<b>1,191</b>	<b>\$ 849,081,483</b>	<b>28</b>	<b>2.0%</b>	<b>\$ 189,791,788</b>	<b>22.4%</b>
<b>State Total</b>	<b>1,756</b>	<b>\$ 1,760,981,988</b>	<b>131</b>	<b>7.0%</b>	<b>\$ 574,314,699</b>	<b>32.6%</b>

**The estimated cost to renovate existing schools has increased.**

Since the last inventory, costs for school renovations increased from \$1.3 billion to \$1.4 billion (7.3%). This is the second consecutive year the estimated cost of renovations has increased. Renovations needed to bring the 131 schools in fair or poor condition to good or excellent condition will require an

School facilities exist to provide students a productive learning experience, but poor facility conditions have been shown to affect student performance. School facilities also play a role in the community as emergency shelters during natural and man-made disasters, and they must be resilient and maintained to meet standards for emergencies.

ASCE Report Card 2013. <http://www.infrastructurereportcard.org/a/#p/schools/conditions-and-performance>.

estimated \$444 million, an average of \$3.4 million per school. While school buildings that are in fair or poor condition cost more to fix than those in better condition, renovations at the 1,626 schools in good or excellent condition make up a larger part of the inventory—\$963 million, approximately \$592 thousand per school. Most schools rated good or excellent require small improvements relative to the costs of improvements at those rated fair or poor, but these small costs add up.

Fair or poor schools account for more than half of all renovation costs in 17 of the 32 systems reporting at least one school rated fair or poor. In two systems, Coffee County and Johnson City, all renovation costs are for schools rated fair. Johnson City needs \$51 million to renovate Science Hill High School, and Coffee County needs \$19.1 million to renovate five of its nine schools.

Even when the overall condition of a school is good or excellent, individual components—such as a classroom, roof, the heating and cooling system, or gymnasium—may need renovation. Statewide, of the 1,626 schools rated good or excellent, 790 need some renovation at an average cost of \$1.2 million per school. Nearly every system, 125 of them in fact, has at least one school rated good or excellent that needs some renovation.

### **The cost to replace schools continues to increase.**

Sometimes renovating a school is not enough to meet the needs of students, and schools have to be replaced. Local officials report that they need to replace nineteen schools statewide at an estimated cost of \$354 million, an increase of \$56.2 million (19%). This is the third consecutive inventory with an increase in the cost to replace schools—\$10.5 million (4%) in 2010 and \$84 million (42%) in 2009. Of the nineteen schools, eleven are in good condition, seven are in fair condition, and one is in poor condition. Beyond the overall condition of a building, age also appears to be a factor in determining the need to replace a building. All of the schools in good condition that need to be replaced were built between 1935 and 1963. Of the seven in fair condition that need to be replaced, all were built before 1975, accounting for \$130 million (37%) of the total cost to replace schools. Two are under construction, and five are still conceptual. The school in poor condition is a Cocke County school that was destroyed by a tornado.

Some schools that should be replaced need to be renovated in the meantime. School systems that cannot immediately afford to replace schools may renovate them instead but still report that they need to be replaced. In some cases, school systems plan to use the school to be replaced for another purpose. Wilson County, for example, replaced Lebanon High School with a new building that opened in 2012. The old building will be renovated and used for grades 6 through 8, which will be moved from other county schools.

***Larger systems report larger total costs, while smaller systems often have higher costs per student.***

School systems with more students also have more school space, which is the main reason larger school systems have greater total needs than smaller systems. Eight of the ten systems with the largest total school infrastructure costs are among the ten systems with the largest number of students (see table 18). The other two systems are Sevier County (11th in enrollment) and Jefferson County (26th in enrollment). The ten systems listed in table 18 account for 58% of the total cost of infrastructure improvements needed at Tennessee's public schools. Some systems, such as Davidson County and Memphis, report higher costs to improve existing schools while others, such as Montgomery County, report higher costs to build new schools.

**Table 18. Ten Systems with the Highest Total Costs for Improvements to Existing Schools**  
*Five-year Period July 2011 through June 2016*

School System	Estimated Cost				2011 Students	
	Total	Improvements to Existing Schools	New Space	System-wide	Number	Rank
Davidson County	\$ 512,868,500	\$ 413,216,500	\$ 99,652,000	\$ 0	\$ 74,832	2
Memphis	344,691,016	341,691,016	3,000,000	0	104,903	1
Wilson County	274,142,370	127,392,370	146,750,000	0	15,408	10
Montgomery County	235,874,731	55,288,000	180,586,731	0	29,202	8
Williamson County	180,224,000	21,424,000	158,800,000	0	31,275	7
Rutherford County	123,691,737	8,811,737	114,700,000	180,000	38,122	6
Sevier County	120,646,736	15,889,019	104,757,717	0	14,315	11
Shelby County	111,854,740	49,229,740	62,625,000	0	46,790	4
Knox County	105,924,369	104,229,684	1,694,685	0	55,588	3
Jefferson County	88,436,551	56,016,551	32,420,000	0	7,353	26
<b>Top Ten Total</b>	<b>\$ 2,098,354,750</b>	<b>\$1,193,188,617</b>	<b>\$ 904,986,133</b>	<b>\$ 180,000</b>	<b>\$ 417,788</b>	
<b>All Others</b>	<b>1,514,835,706</b>	<b>861,387,564</b>	<b>635,545,142</b>	<b>17,903,000</b>	<b>531,566</b>	
<b>State Total</b>	<b>\$ 3,613,190,456</b>	<b>\$2,054,576,181</b>	<b>\$ 1,540,531,275</b>	<b>\$18,083,000</b>	<b>\$ 949,354</b>	

Small school systems can be overlooked when considering overall costs. Compared with larger school systems, those with fewer students may report lower infrastructure costs, but when their cost per student is considered, it becomes clear that their needs may be relatively large. See table 19. A small project in a school system with few students can cost more per student than a large project in a system with more students. As with the larger systems, some smaller systems have a greater need to improve existing schools, while others have a greater need to build new schools.

**Table 19. Ten Systems with the Highest Per Student Costs for Improvements to Existing Schools**  
*Five-year Period July 2011 through June 2016*

School System	Estimated Cost				2011 Students		
	Total	Improvements to Existing Schools	New Space	System-wide	Number	Rank	Cost Per Student
Van Buren County	\$ 18,611,000	\$ 70,000	\$ 18,541,000	\$ 0	717	126	\$ 25,964
Pickett County	15,237,500	237,500	15,000,000	0	705	127	21,613
Coffee County	78,293,000	66,293,000	12,000,000	0	4,336	50	18,056
Wilson County	274,142,370	127,392,370	146,750,000	0	15,408	10	17,792
DeKalb County	44,608,000	1,888,000	42,720,000	0	2,870	79	15,543
Alamo	8,590,000	340,000	8,250,000	0	579	130	14,835
Lake County	10,750,000	10,660,000	90,000	0	884	123	12,165
Jefferson County	88,436,551	56,016,551	32,420,000	0	7,353	26	12,027
Bristol	42,869,500	40,869,500	2,000,000	0	3,876	58	11,060
Greeneville	26,130,000	26,130,000	0	0	2,676	82	9,764
<b>Top Ten Total</b>	<b>\$ 607,667,921</b>	<b>\$ 329,896,921</b>	<b>\$ 277,771,000</b>	<b>\$ 0</b>	<b>39,404</b>		<b>\$ 15,421</b>
<b>All Others</b>	<b>3,005,522,535</b>	<b>1,724,679,260</b>	<b>1,262,760,275</b>	<b>18,083,000</b>	<b>909,950</b>		<b>3,303</b>
<b>State Total</b>	<b>\$ 3,613,190,456</b>	<b>\$ 2,054,576,181</b>	<b>\$1,540,531,275</b>	<b>\$18,083,000</b>	<b>949,354</b>		<b>\$ 3,806</b>

Van Buren County reports the highest cost per student for improvements to existing schools (\$25,964) compared with the state average of \$3,806 per student. Van Buren's high cost per student is driven by a new school that has been in the conceptual phase in the inventory since 2005. Pickett County, with the second highest cost per student (\$21,613), also needs a new school. As with Van Buren, this school entered the inventory in 2005 and remains conceptual. The cost of new space is also driving high costs per student for DeKalb County, which needs a new \$42 million school, and Alamo, which needs an \$8.5 expansion to Alamo Elementary.

Lake County, Greeneville, and Bristol's large cost per student is because of improvements to existing schools. Renovations first reported in 2005 are planned at all three of Lake County's schools. With a "fair" condition rating, Lake County High School needs renovations of all of

its classrooms, the cafeteria, the library, administrative offices, and the gym. Margaret Newman Elementary School is reported in good condition overall, but some components need to be upgraded. Both of these projects remain in the conceptual phase. A third project, the addition of a music classroom at Laura Kendall Elementary, is currently under construction.

Greeneville, which is the 82nd largest system, needs just under \$10,000 per student to improve existing schools. Nearly all of this, \$22.8 million, is to replace Greeneville Middle School. This replacement school has been in the inventory since 2008, and the estimated fiscal year start has been pushed to 2015.

Bristol, which is the 58th largest school system, several times the size of Lake, and nearly 50% larger than Greeneville, has four schools in fair condition that need expensive updates to many components, including classrooms, libraries, gyms, and cafeterias. Most of these have been in the inventory for several years, but only those at Tennessee High School have advanced to the planning and design phase. Two Bristol schools are in good condition and need just a few upgrades; they have projects under construction to update heating and air systems and otherwise improve energy efficiency.

Two of the systems that ranked among those with the highest total cost, Jefferson County and Wilson County, also rank among the systems with the highest cost per student. Both of these systems report relatively high needs for both new space and improvements to existing schools. Wilson stands out in table 19 because of its larger enrollment, meaning its high cost per student is not an artifact of a small enrollment. Wilson had the third highest new space need in the state, \$147 million for five new schools. Their \$127 million in improvements include two replacement schools totaling \$82 million. Jefferson County's improvements include renovations to Jefferson County High School totaling \$25 million and two new schools, the Freshman Academy (\$16 million) and Mt. Horeb Elementary (\$11 million). Both new schools are under construction.