

Building Tennessee’s Tomorrow: Anticipating the State’s Infrastructure Needs

July 2020 through June 2025

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DRAFT

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INTRODUCTION

Why do we rely on the public sector for roads, bridges, water lines, and schoolhouses? Certain goods and services—such as clean drinking water, education, and commerce, as well as roads to access employment—must be provided in the interest of general health and safety. 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. Therefore, we look to those who represent us in our public institutions to set priorities and find ways to fund them. Under normal circumstances it can be a daunting task for government officials to match limited funds to seemingly unlimited needs; now, officials must address this challenge alongside the effects of the continuing COVID-19 pandemic, the effects of which include potential tax revenue losses and rising public health expenditures.

Why inventory public infrastructure needs?

In 1996, the Tennessee General Assembly enacted legislation that affirmed the value of public infrastructure. An inventory of necessary infrastructure was laid out “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

through the provision of adequate and essential public infrastructure.”¹ 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;² the capital budget requests submitted to the Governor by state officials as part of the annual budget process; needed capital projects from the Tennessee Board of Regents (TBR), 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

“The \$20 trillion US economy relies on a vast network of infrastructure from roads and bridges to freight rail and ports to electrical grids and internet provision. But the systems currently in place were built decades ago, and economists say that delays and rising maintenance costs are holding economic performance back.”

James McBride and Anshu Siripurapu, Council on Foreign Relations, *The State of US Infrastructure*. November 8, 2021.

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

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

“From roads and transportation systems, to water and waste transport, to broadband, to the power grid, infrastructure enables the economy to function. Time and again, analyses quantifying the effects of this kind of public investment show that they support economic growth.”

Heather Boushey, Council of Academic Advisors, *Bringing Infrastructure into the 21st Century*. November 2021.

infrastructure needs of Tennessee's citizens as envisioned by the enabling legislation.

What infrastructure is included in the inventory?

For the 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 \$50,000.³

Local officials were asked to describe anticipated needs for the period of July 1, 2020, through June 30, 2040, 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—conceptual, planning, and design, or under construction—as of July 1, 2020. Because of legislation requiring the inventory's use by the Commission to monitor implementation of Tennessee's Growth Policy Act, in 2000, the period covered by each inventory was expanded from 5 years to 20 years.⁴ 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 and the following types of public infrastructure (see the glossary for definitions of project types):

- Transportation and Utilities
 - Transportation
 - Other Utilities
 - Broadband
- Education
 - Post-secondary Education
 - School Renovations
 - New Public Schools and Additions
 - Other Education
 - School System-wide
- Health, Safety, and Welfare
 - Water and Wastewater
 - Law Enforcement
 - Public Health Facilities

³ School technology infrastructure is included for existing schools regardless of cost in order to provide information related to the technology component of the state's education funding formula.

⁴ Public Chapter 672, Acts of 2000.

- Housing
- Fire Protection
- Storm Water
- Solid Waste
- Recreation and Culture
 - Recreation
 - Libraries, Museums, and Historic Sites
 - Community Development
- General Government
 - Public Buildings
 - Other Facilities
- Economic Development
 - Industrial Sites and Parks
 - Business District Development

Within these parameters, local officials are asked 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 the Tennessee Department of Transportation (TDOT), capital projects from TBR, 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 forms⁵ to gather information from local officials about necessary infrastructure improvements. The Existing School Facility Needs Inventory Form is 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. The General Public Infrastructure Needs Inventory Form is used to gather information about all other types of infrastructure including the need for new public school buildings and school system-wide infrastructure improvements not gathered on the school inventory form. TACIR staff provide local officials with supplemental information from the state highway department about transportation needs, many of which originate from local officials.

⁵ Both forms are included in appendix C.

K-12 public school renovations were up slightly. Most of this increase is from the \$1 billion rise in needed improvements for post-secondary education, while the need for school renovations increased by \$150 million.

This information helps ensure that all known needs are captured in the inventory.

In addition to gathering information from local officials, TACIR staff incorporates capital improvement requests submitted by state officials to the Governor's Budget Office, bridge and road needs from project listings provided by TDOT, and needed capital projects from TBR. While TACIR staff spends considerable time reviewing all the information in the inventory to ensure accuracy and consistency, it is based on the judgment of state and local officials. In many cases, information about local needs is limited to those included in the capital improvements programs of local governments, which means the inventory may not fully capture all local requirements.

As discussed above, projects included in the report are only those in the conceptual, planning and design, or construction stage at some point during the five-year period of July 2020 through June 2025. For projects started before the five-year period, estimated costs for the projects may include amounts spent before July 2020; for projects that won't be completed during the five-year period, amounts must be spent after June 2025. All of those projects are initially recorded as conceptual because capital budget requests generally serve as the source of information from state agencies (TDOT and TBR, excepted).

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.*⁶ The mandates most commonly reported are the Americans with Disabilities Act (ADA), asbestos, lead, underground storage tanks, and the Education Improvement Act (EIA). The EIA mandate reduced the target number of students in each K-12 public school classroom by fall 2001. Tennessee public schools began working toward that goal after the passage of the EIA in 1992, which was met by adding classroom space and hiring a sufficient number of teachers.⁷ However, some schools continue to use portable classrooms because they still do not have sufficient traditional classroom space to accommodate both teachers and students.

Except in the case of existing public schools, the inventory does not include estimates of the cost to comply with mandates. Even in the case of public schools, with the exception of the EIA, the cost reported to the Commission as part of the Public Infrastructure Needs Inventory is relatively small—accounting for less than 1% of the total reported Public School Infrastructure Needs. See appendix E-9.

⁶ See the Glossary of Terms at the end of the report.

⁷ Tennessee Comptroller of the Treasury 2004. "The Education Improvement Act: A Progress Report." <http://comptroller.tn.gov/repository/RE/educimproveact.pdf>.

How is the inventory used?

The Public Infrastructure Needs Inventory is both a product and a continuous process, one that has been useful in

- planning short-term and long-range goals,
- 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 setting priorities.

The Public Infrastructure Needs Inventory has become a tool for setting priorities and making informed decisions that is used by all stakeholders. Many decision-makers have noted that in a time of tight budgets and crisis-based, reactive decisions, the annual inventory process offers the one opportunity they have to set funding issues aside for a moment and think proactively and broadly about real infrastructure needs. For most officials in rural areas and in smaller cities, the inventory is the closest thing they have to a Capital Improvements Program (CIP). 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 formal opportunity officials have to consider the long-range benefits of infrastructure.

The inventory helps match critical needs to limited funding opportunities.

In the absence of a formal CIP, the Public Infrastructure Needs Inventory provides basic information to state and local officials to match needs with funding. 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 US Economic Development Administration.⁸ Projects are not considered for funding by that agency unless they are listed in one of these reports. 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 also 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.

⁸ US Economic Development Administration. "CEDS Content Guidelines." <https://www.eda.gov/ceds/>.

Infrastructure funding provided by the Environmental Protection Agency to Tennessee "will create jobs while upgrading America's aging water infrastructure and addressing key challenges like lead in drinking water and per- and poly-fluoroalkyl substances (PFAS) contamination."

Michael S. Regan,
Environmental Protection
Agency, *EPA Announces
\$120,833,000 for Water
Infrastructure Projects in
Tennessee*. December 2, 2021.

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

Local officials are asked to report the condition of all schools on the Existing School Facility Needs Inventory Form, not just those 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 school systems, as well as providing an overview of patterns and trends across the state. 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.

As a result of the inventory, the state's infrastructure needs have been reported to a broader 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, regional, and state, levels. It gives voice to small towns and rural communities with limited planning resources. 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 regarding its broad scope and comprehensive nature. Through the inventory process, development districts have expanded their contact, communication, and collaboration with across agencies (e.g., local boards of education, utility districts, and TDOT) and strengthened personal relationships and trust among 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?

As variants of COVID-19 threaten an imminent return to pre-pandemic life, governments continue to take various measures to contain the spread of COVID-19 to try to preserve public health and reduce the loss of life as a direct result of the virus. The extent to which the pandemic might affect the public infrastructure needs of Tennessee communities has been among the many uncertainties stemming from the pandemic. In the first interim report of a two-phase project, the Commission analyzed the effects of past socioeconomic disruptions, including the Great Recession, to establish a baseline for analyzing data collected during the COVID-19 pandemic.

Although Tennessee's reported public infrastructure needs increased alongside an expanding economy over the last decade, the Commission's analysis did not uncover any major shift in needs stemming from the Great Recession—whether in terms of dollar amount, project type, or project

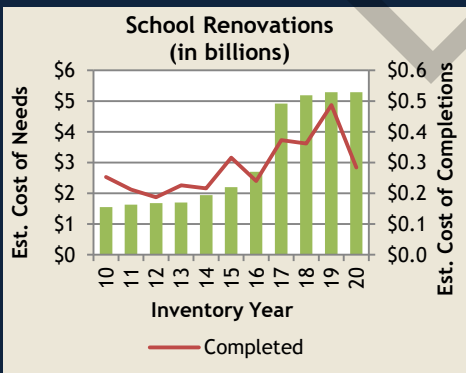
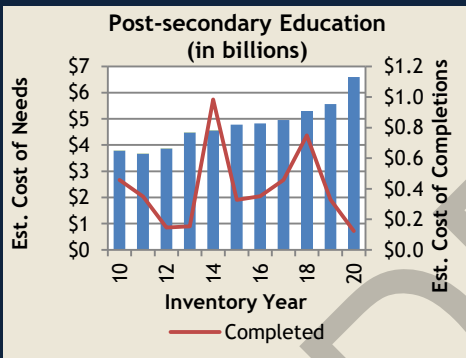
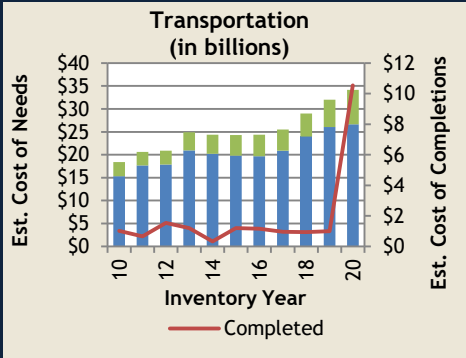
progression. The extent to which the COVID-19 pandemic has affected the public infrastructure needs of communities in Tennessee is an open question. For example, as more people work from home, commuting has declined, potentially reducing wear and tear on transportation infrastructure. At the same time, as consumers turn to online ordering and delivery services rather than shopping in person, long-distance transportation of consumer goods and home deliveries may increase road use by trucks and other delivery vehicles. For many Tennesseans, the shift to remote work and learning has highlighted needed improvements in broadband infrastructure. The pandemic has also highlighted technological infrastructure needs in public schools, including such items as computers and other electronic devices. In a survey of Tennessee local government officials, 95.8% responded that the pandemic had a significant effect on their school system. In those cities and counties that operate a school system, every official who responded to the survey indicated that the pandemic has increased the need for technology for public schools. Furthermore, the availability of funding for infrastructure projects is also uncertain. While tax collections in Tennessee performed better than expected overall in 2020 (and continue to grow) some public infrastructure revenue streams—such as the taxes on gasoline and motor fuel that help fund Tennessee’s highway system and local roads—have not performed as well since the pandemic began.

TACIR is currently conducting an analysis to compare and contrast the effects of COVID19-induced disruptions by using historical trends to determine their effects on public infrastructure development or priorities. This is the second phase of the project that will utilize the existing public infrastructure data to identify trends and correlations with other variables, such as revenue, that affect the operations of state and local governments in Tennessee.

State Total

Total Estimated Cost* for Infrastructure Improvements
\$61,941,126,759

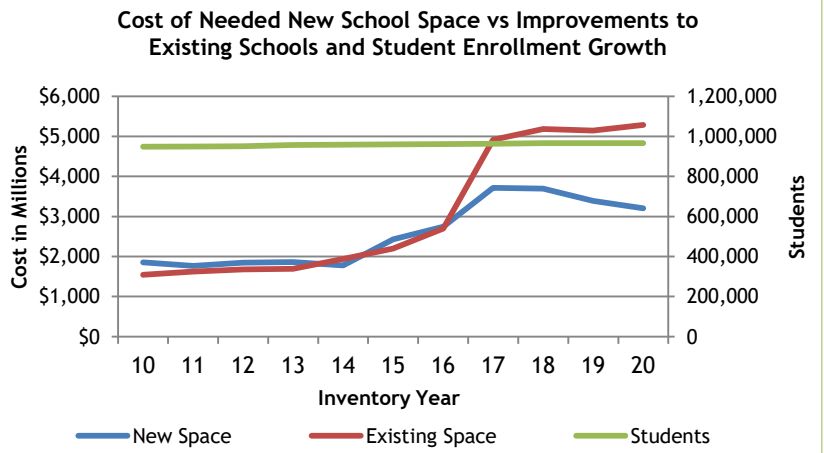
TOP 3



■ = Local
■ = Regional (Serves Multiple Counties)

Estimated Cost of Needed Infrastructure for State Total Five-year period July 2020 through June 2025

Project Type	Conceptual	Planning & Design + Construction
Transportation	\$ 10,541,739,574	\$ 23,587,580,276
Post-secondary Education	3,240,791,915	3,355,875,067
School Renovations	4,387,406,266	898,501,325
Water and Wastewater	1,113,075,532	3,821,903,144
New Public Schools & Additions	1,833,341,988	1,371,593,151
Law Enforcement	1,030,627,274	998,865,518
Recreation	634,399,060	1,000,629,922
Public Buildings	769,983,000	342,114,057
Public Health Facilities	394,227,500	224,094,187
Other Utilities	81,286,386	444,857,233
Libraries, Museums, & Historic Sites	119,068,300	235,365,147
Fire Protection	199,074,087	116,681,916
Community Development	100,858,280	169,893,820
Housing	14,607,000	242,682,080
Industrial Sites and Parks	50,111,500	169,698,288
Other Facilities	43,356,700	93,441,750
Storm Water	73,979,000	23,185,474
Other Education	36,320,000	35,330,000
Business District Development	27,150,000	30,411,006
School-System-wide	10,492,000	27,401,036
Solid Waste	11,960,000	23,667,000
Broadband	-	13,500,000
Total	\$ 24,713,855,362	\$ 37,227,271,397



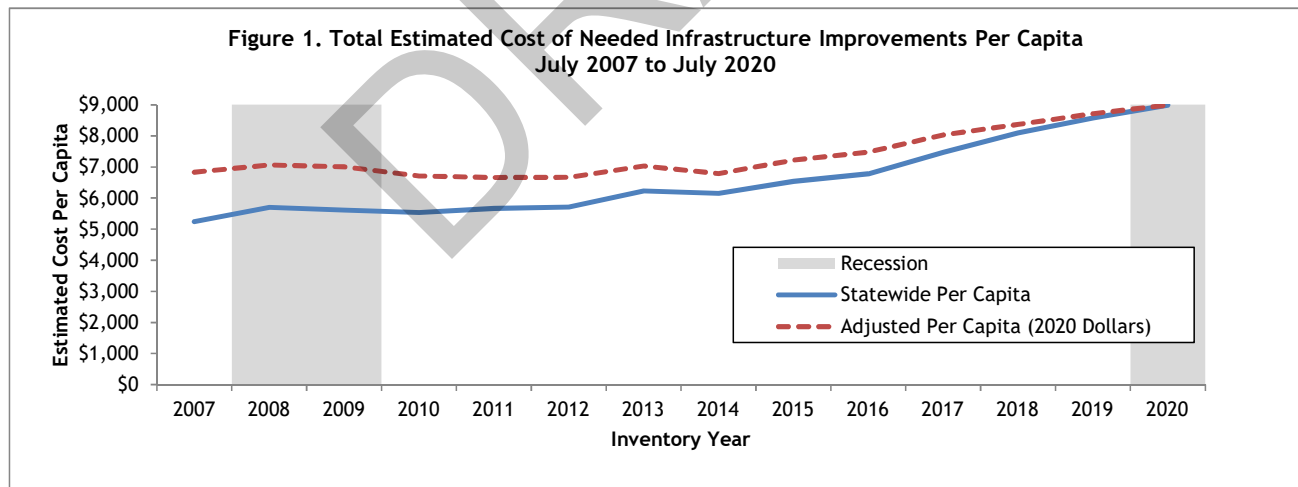
*Total Estimated Cost = Conceptual + Planning & Design + Construction

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INFRASTRUCTURE NEEDS OVERVIEW

The estimated cost of all needed public infrastructure improvements in Tennessee increased for the sixth straight reporting period, even when adjusted for inflation⁹ and population (see figure 1). State and local officials report an increase of approximately \$3.4 billion (5.7%) in this year’s inventory (see table 1), which brings the estimated cost of public infrastructure improvements that need to be in some stage of development (see figure 2) between July 1, 2020, and June 30, 2025, to \$61.9 billion.¹⁰ Improvements needed for the following categories continue to account for most of the total estimated cost of the inventory: Transportation and Utilities; Education; and Health, Safety, and Welfare. This year, the categories most responsible for the reported increase in total estimated cost are Transportation and Utilities, followed by Education. The percentage of available funding was approximately 2% less than last year—67.4% of the estimated cost of the needed improvements reported in this year’s inventory is not funded.



⁹ Federal Reserve Bank of St. Louis, State and Local Government Consumption Price Index

¹⁰ For complete listings of all needs reported in the July 2020 inventory by county and by public school system, see appendixes D and E.

Table 1. Comparison of Estimated Cost of Needed Infrastructure Improvements
July 2019 Inventory vs. July 2020 Inventory

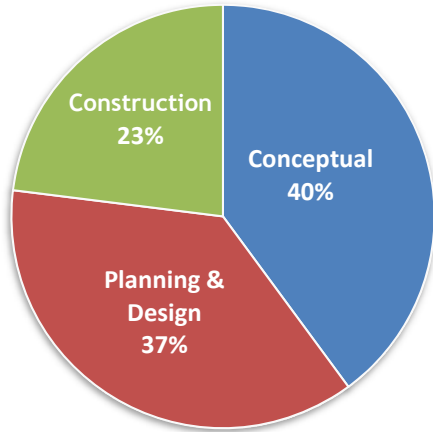
Category and Type of Infrastructure	July 2019 Inventory	July 2020 Inventory	Difference	Percent Change
Transportation and Utilities	\$ 32,653,927,353	\$ 34,668,963,469	\$ 2,015,036,116	6.2%
Transportation	32,003,572,236	34,129,319,850	2,125,747,614	6.6%
Other Utilities	636,855,117	526,143,619	(110,711,498)	-17.4%
Broadband	13,500,000	13,500,000	-	0.0%
Education	\$ 14,219,150,607	\$ 15,197,052,748	\$ 977,902,141	6.9%
Post-secondary Education	5,568,647,945	6,596,666,982	1,028,019,037	18.5%
School Renovations*	5,145,291,243	5,285,907,591	140,616,348	2.7%
New Public Schools & Additions	3,391,244,419	3,204,935,139	(186,309,280)	-5.5%
Other Education**	75,815,000	71,650,000	(4,165,000)	-5.5%
School-System-wide	38,152,000	37,893,036	(258,964)	-0.7%
Health, Safety and Welfare	\$ 7,713,235,286	\$ 8,288,629,712	\$ 575,394,426	7.5%
Water and Wastewater	4,957,877,144	4,934,978,676	(22,898,468)	-0.5%
Law Enforcement	1,428,365,792	2,029,492,792	601,127,000	42.1%
Public Health Facilities	603,519,229	618,321,687	14,802,458	2.5%
Housing	328,117,911	257,289,080	(70,828,831)	-21.6%
Fire Protection	278,593,015	315,756,003	37,162,988	13.3%
Storm Water	84,102,924	97,164,474	13,061,550	15.5%
Solid Waste	32,659,271	35,627,000	2,967,729	9.1%
Recreation and Culture	\$ 2,253,176,802	\$ 2,260,214,529	\$ 7,037,727	0.3%
Recreation	1,658,840,685	1,635,028,982	(23,811,703)	-1.4%
Libraries, Museums, and Historic Sites	344,799,838	354,433,447	9,633,609	2.8%
Community Development	249,536,279	270,752,100	21,215,821	8.5%
General Government	\$ 1,459,012,414	\$ 1,248,895,507	\$ (210,116,907)	-14.4%
Public Buildings	1,285,545,780	1,112,097,057	(173,448,723)	-13.5%
Other Facilities	173,466,634	136,798,450	(36,668,184)	-21.1%
Economic Development	\$ 285,874,421	\$ 277,370,794	\$ (8,503,627)	-3.0%
Industrial Sites and Parks	214,741,363	219,809,788	5,068,425	2.4%
Business District Development	71,133,058	57,561,006	(13,572,052)	-19.1%
Grand Total	\$ 58,584,376,883	\$ 61,941,126,759	\$ 3,356,749,876	5.7%

*School Renovations include school technology projects with estimated costs below the \$50,000 threshold used for other types of infrastructure included in the inventory. Individual technology projects under the threshold totaled \$4,749,126 in 2020 and \$3,692,173 in 2019.

**Other Education includes infrastructure improvements reported at state educational institutions not associated with institutes of higher education or at the county, city, or special school systems level. Examples include the Tennessee School for the Deaf and Alvin C. York Institute.

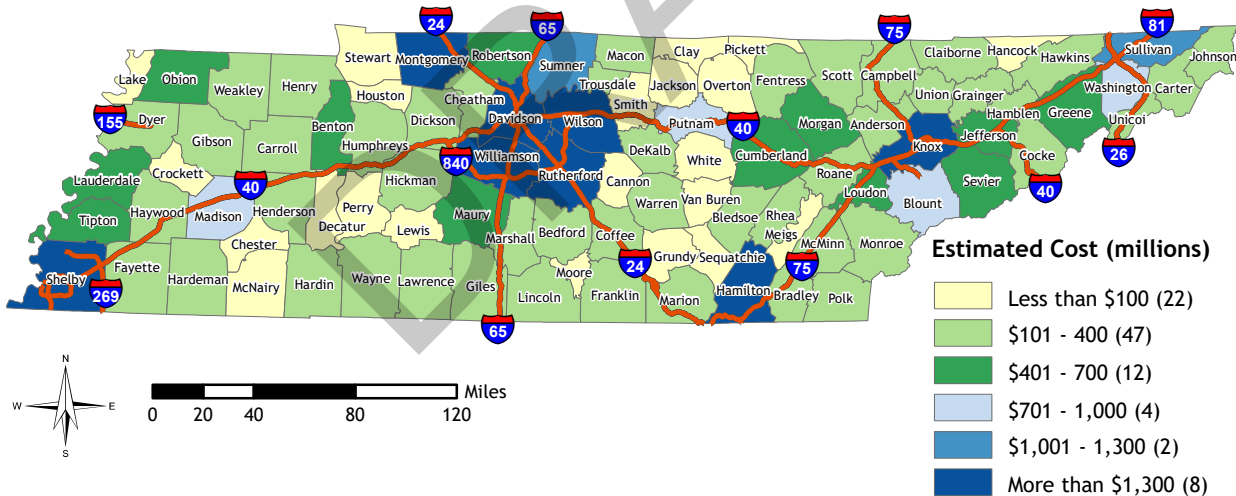
Figure 2. Percent of Total Reported Cost of Infrastructure Improvements by Stage of Development

Five-year Period July 2020 through June 2025



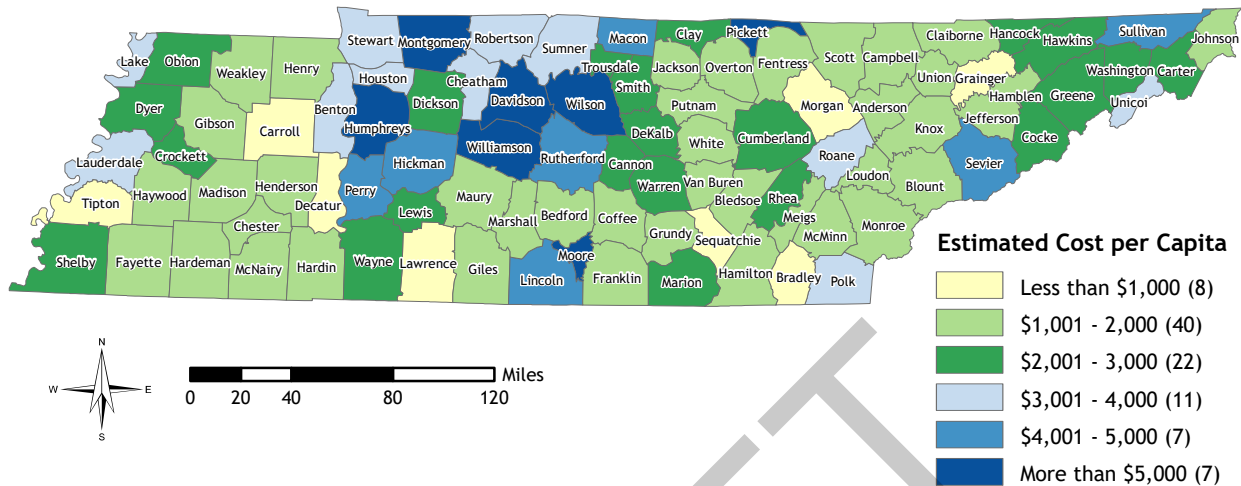
Public infrastructure is needed in every corner of the state, from highly populated counties like Shelby and Davidson to rural counties like Humphreys and Pickett. In general, it has been the case throughout the history of this inventory that the more people living in a county and the more that population grows, the more infrastructure the county will need (see map 1). However, relative to their populations, counties with small populations need just as much or more infrastructure than counties with large populations (see map 2). Individual county summaries, starting on page 21, offer a breakdown of infrastructure needs by county.

Map 1. Total Estimated Cost of Needed Infrastructure Improvements Five-year Period July 2020 through June 2025



Note: County totals include the total estimated cost of both regional and local infrastructure needs but do not include the \$4,948,036,940 for infrastructure improvements that cross county lines.

Map 2. Estimated Cost of Needed Local Infrastructure Improvements per Capita Five-year Period July 2020 through June 2025



Public infrastructure needed for transportation, utilities, and education accounts for 89.4% of the increase in this year's inventory.

Of the \$3.4 billion increase in infrastructure needs reported in this year's inventory, just over \$2.0 billion (60.2%) is attributable to increases in the estimated cost for transportation and utilities, followed by \$987 million (29.4%) for increases in the cost of education. Infrastructure needs for transportation and utilities increased for the sixth year in a row. Increases in the cost of road projects (\$1.5 billion) and an increase in new road projects (\$1.1 billion) attributed to the overall increase of transportation infrastructure, though these costs were offset by \$521 million in completed road projects. Additionally, Nashville reports needing high capacity bus rapid transit at a cost of \$506 million.

The \$987 million increase in needed improvements for education infrastructure is also attributable to the overall increase in the total estimated cost of the inventory. Most of this increase is from the \$1 billion rise in needed improvements for post-secondary education, while the need for school renovations increased by \$150 million. The increase in the estimated cost of needed improvements to post-secondary education stems mainly from \$1.6 billion in new projects. Of this increase, \$431 million is attributable to four projects including the construction of the University of Tennessee College of Medicine building in Shelby County (\$200 million), an expansion of the University of Tennessee Knoxville Academic and Instructional Support Facility (\$100 million), construction of a new health professions building at Austin Peay State University (\$68 million) and a renovation of the University of Tennessee Knoxville nursing building (\$63 million).

Needs also increased for Health, Safety and Welfare (\$575 million), which is attributable to a 42% increase in law enforcement projects (\$601 million). Reported needs decreased in three categories: General Government (\$210 million), Economic Development (\$9 million), and Recreation and Culture (\$3 million). See table 1.

The total estimated cost for needed transportation infrastructure continues to be the largest item in the inventory.

Transportation and Utilities is and always has been the largest category of infrastructure in the inventory, based on total estimated cost. It totals \$34.7 billion this year—56.0% of the inventory. Transportation alone, at \$34.1 billion, accounts for nearly all of this category and is larger than all other categories in the inventory—Education at \$15.2 billion (24.5%), Health, Safety, and Welfare at \$8.3 billion (13.4%), Recreation and Culture at \$2.3 billion (3.6%), General Government at \$1.2 billion (2.0%), and Economic Development at \$277 million (0.4%).

The need for other utilities decreased, while the need for broadband infrastructure did not change.

Needs reported for other utilities, including projects such as installation of gas lines and electrical cables, decreased by \$111 million (17.4%) in this year's inventory and now total \$526 million. Local officials continue to report the need for \$13.5 million in broadband infrastructure, in just the fifth year of reporting this category. Broadband development in the inventory includes only projects owned by government entities, and very little is expected to be reflected in this category because the nature of broadband deployment in rural areas relies less on municipal utility districts, which are sub-entities of municipal governments, and more on privately-owned utility providers.

Increases in needed infrastructure improvement on college campuses and increases in needed technology in K-12 schools appears to be driving the increase in Education needs.

School systems must comply with the Tennessee Constitution's guarantee of the right of access to public education,¹¹ as well as with the Tennessee Education Improvement Act of 1992,¹² which places limits on the number of students in classrooms. School systems with growing enrollment face the challenge of providing enough space for students, while other school systems need to renovate or replace their schools because of age, condition, or issues concerning school restructuring or consolidation, all

¹¹ Article XI, Section 12, Constitution of the State of Tennessee.

¹² State of Tennessee Comptroller of the Treasury. 2004. "The Education Improvement Act: A Progress Report." https://comptroller.tn.gov/content/dam/cot/orea/advanced-search/orea-reports-2004/2004_OREA_EdImpAct.pdf.

"In addition to the threat to human safety of catastrophic failures such as bridge collapses or dam breaches, inadequately maintained roads, trains, and waterways cost billions of dollars in lost economic productivity."

James McBride and Anshu Siripurapu, Council on Foreign Relations, *The State of US Infrastructure*. November 8, 2021.

while costs increase. Similar issues face Tennessee’s public institutions of higher education—dormitories need to be replaced because of their age, and classrooms and labs need to be added or upgraded to meet typical market demands.

In this year’s inventory, an increase of \$987 million (6.9%) in the Education category, compared to last year’s reported needs, is the result of offsetting changes in the estimated costs of different types of education. Post-secondary education costs increased by \$1 billion (18.5%) and school renovation costs increased by \$150 million (2.9%). These increases were only partially offset by the \$186 million (5.5%) decrease in the total estimated cost for new public schools and additions, which totals \$3.2 billion. See table 2.

Table 2. Estimated Cost of School Infrastructure Improvements by Type of Need
July 2019 Inventory vs. July 2020 Inventory

Type of Infrastructure	July 2019 Inventory	July 2020 Inventory	Difference	Percent Change
Post-secondary Education	\$ 5,568,647,945	\$ 6,596,666,982	\$ 1,028,019,037	18.5%
School Renovations	\$ 5,145,291,243	\$ 5,285,907,591	\$ 140,616,348	2.7%
Renovations	4,934,789,181	4,980,602,494	45,813,313	0.9%
Technology	112,348,367	211,532,190	99,183,823	88.3%
Mandates	98,153,695	93,772,907	(4,380,788)	-4.5%
New Public Schools and Additions	\$ 3,391,244,419	\$ 3,204,935,139	\$ (186,309,280)	-5.5%
New Schools	2,755,471,984	2,665,643,679	(89,828,305)	-3.3%
Additions	635,772,435	539,291,460	(96,480,975)	-15.2%
Other Education	\$ 75,815,000	\$ 71,650,000	\$ (4,165,000)	-5.5%
System-wide Needs	\$ 38,152,000	\$ 37,893,036	\$ (258,964)	-0.7%
Statewide Total	\$ 14,219,150,607	\$ 15,197,052,748	\$ 977,902,141	6.9%

Technology infrastructure needs in K-12 public schools increased by \$99 million (88.3%). Just over half of the increase was for projects in Davidson (\$31 million) and Williamson (\$14 million) Counties for laptops and Wi-Fi hotspots for students and teachers. Several other counties reported similar needs, including Robertson County (\$2 million) and Rutherford County (\$1 million). The significant increase in technology needs in the current year’s inventory is in part a response to the COVID-19 pandemic.¹³

Because of the condition of many Tennessee schools, improvements to existing space are necessary. Although 11% of public schools (182) in

¹³ Johnson, Emma, Bob Moreo, Michael Mount, Matt Owen, Mark McAdoo, and Melissa Brown. 2021. *The Effect of the COVID-19 Recession on Public Infrastructure Needs, Interim Report: Lessons Learned from the Great Recession* (December 2007 – June 2009) and *Early Observations from Local Government Officials*. https://www.tn.gov/content/dam/tn/tacir/2021publications/2021PINISpecialProject_StaffReport.pdf and State of Tennessee Department of Education. 2020. “Gov. Lee Announces \$81 Million in Coronavirus Relief Grants for K-12 and Higher Education Institutions.” <https://www.tn.gov/education/news/2020/7/7/gov-lee-announces--81-million-in-coronavirus-relief-grants-for-k-12-and-higher-education-institutions.html>.

Tennessee were rated by their local school officials as being in fair or poor condition, 168 of those schools need improvements to existing space, which accounts for 47.5% of total estimated existing space needs. See figure 3, table 3, and appendix E.

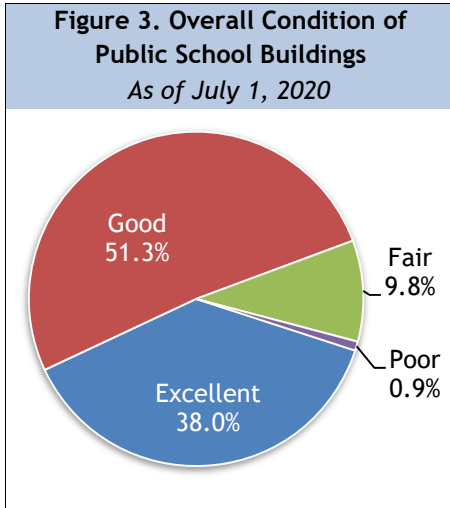


Table 3. Renovations Costs by School Condition
Five-year Period July 2020 through June 2025

School Condition	Number of Schools	Estimated Cost to Renovate	Average Cost Per School
Good or Excellent	881	\$ 2,615,809,289	\$ 2,969,137
Fair or Poor	168	2,364,630,063	14,075,179
Total	1,049	\$ 4,980,439,352	\$ 4,747,797

Note: This does not include facility upgrade costs captured in the school system-wide category used for the total renovation cost in table 2.

The need for new school space decreased in this year’s inventory by \$186 million (5.5%) to a new total of \$3.2 billion. Local officials reported a decrease of \$96 million in the need for additions to existing schools, along with a \$90 million (3.3%) decrease in reported needs for new schools (see table 2), mainly because 11 schools worth \$344 million were completed in 9 school systems.

The cost of needed education infrastructure has increased over the years mainly because of the rising cost of construction materials and labor. The US Bureau of Labor Statistics’ New School Construction Price Index rose almost 44 points (33.3%) from July 2010 to July 2020.¹⁴ In 2010, the average cost of a completed new school in Tennessee was \$18 million. Eleven schools—ranging from a new \$107 million high school in Wilson County to a \$10 million preschool for the city of Oak Ridge—were completed since last year’s report for a total cost of \$344 million, averaging \$31 million per school. Over the next five years, local officials report needing 69 more schools at an average of \$39 million each.

The need for new law enforcement headquarters and criminal justice centers, along with needs for new infrastructure to protect us from fires, accounts for most of the increase in the Health, Safety, and Welfare category.

Law enforcement infrastructure needs increased \$601 million to \$2 billion in total. Existing project cost increases account for \$386 million with most of the cost increase (\$279 million) attributable to building a multi-agency

“Public school facilities that are well planned, designed, built, operated and maintained have an outsized positive impact on education, health, the natural environment and our communities”

Mary Filardo, 21st Century School Fund, 2021 *State of Our Schools: America’s PK–12 Public School Facilities 2021*. May 2021.

¹⁴ US Bureau of Labor Statistics. 2020. <https://data.bls.gov/pdq/SurveyOutputServlet>.

“Water helps Tennessee thrive and supports many significant activities, such as drinking water, wastewater, and stormwater services for residents and businesses; agriculture; major industrial operations; transportation of goods on navigable waters; and recreational activities on lakes, rivers, and streams.”

Tennessee Department of Environment and Conservation, *Tennessee Deployment of American Rescue Plan Funding: Water Infrastructure Investment Plan*. December 17, 2021.

law enforcement training center in Nashville. Costs for two other projects in Nashville also increased substantially, including the Criminal Justice Center Plaza (\$37 million) and a new Sheriff Administrative Office (\$20 million). New law enforcement projects account for \$334 million. Sullivan County needs to expand its county jail (\$80 million) and Warren County needs a new Criminal Justice Center (\$30 million). The rest of the new needs fall below \$10 million per project.

The need for fire protection also increased by \$37 million (13.3%) and now totals \$316 million. Murfreesboro needs \$21 million for three new fire stations and \$13 million to replace two existing fire stations. The rest of the new needs reported are much smaller and scattered across the state.

Water and wastewater infrastructure needs decreased by \$23 million to \$4.9 billion. With funds made available by the passage of the federal American Rescue Plan Act of 2021, the Tennessee Department of Environment and Conservation will be administering \$1.4 billion in non-competitive and competitive grants targeting water, wastewater, and storm water infrastructure needs.¹⁵ With these grants, previously unfunded projects may finally progress and previously underreported projects may be captured.

The need for projects that support recreation and cultural assets increased slightly, and upgrades to existing public buildings have decreased significantly.

The estimated cost of infrastructure needs for recreation and cultural assets increased for the sixth straight year by \$7 million (0.3%) to a total of \$2.3 billion. The need for infrastructure improvements that support community development shows an increase of \$23 million (10.9%), totaling \$233 million in this year's inventory. The estimated cost for libraries, museums, and historic sites also increased by \$10 million (2.8%) and totals \$354 million. These increases were offset by a \$24 million (1.4%) decrease in recreation infrastructure needs. There were \$206 million in new project and \$61 in increases, but these were offset by \$96 million in completed project and \$56 million in cancelled projects.

Among needs reported for public buildings, the estimated cost of needed infrastructure for public buildings decreased \$173 million (13.5%) and now totals \$1 billion, mainly because of large decreases in scope of renovation projects on state buildings. The cost for infrastructure needed for other facilities—structures that are publicly owned but not typically open to the public, like maintenance facilities and salt bins—decreased \$37 million (21.1%) to a total of \$137 million.

¹⁵ Tennessee Department of Environment and Conservation. 2021. “TDEC’s Water Infrastructure Investment Plan.” <https://www.tn.gov/environment/arp/tdec-funding-plan.html>.

The estimated cost for needed infrastructure at industrial sites and parks increased by \$5 million (2.4%) to a new total of \$220 million, while the estimated cost of infrastructure supporting business districts decreased by \$14 million (19.1%) and now totals \$58 million.

In this year’s inventory, funding is lacking for nearly two-thirds of the estimated cost of needed improvements.

Information about funding for public infrastructure needs reported by officials indicates that 67.4% of the funds required to meet those needs was not available at the time the inventory was conducted – this was relatively unchanged from last year’s 65.1%. Excluding improvements needed at existing schools and those drawn from capital budget requests submitted by state agencies – neither of which includes funding information – only \$15.1 billion in funding is available for the remaining \$46.3 billion in needs (see table 4). Typically, as a project evolves, funding sources are identified and pursued. Regarding the infrastructure inventory process, planning and design cannot take place without acquiring some funds. Of course, a lack of funding will prevent certain projects from ever being completed. In fact, most of the infrastructure needs reported in the July 2015 inventory that were not already fully funded were still needed five years later. As in prior years, funding for needs reported in the inventory comes from federal, state, and local sources.

The federal Infrastructure Investment and Jobs Act (IIJA) authorizes \$1.2 trillion over five years from federal fiscal years 2022 through 2026, including \$550 billion in new spending per Public Law No. 117-58.

Table 4. Public Infrastructure Needs Summary of Funding Availability*
Five-year Period July 2020 through June 2025

	Funding Available [in billions]	Funding Needed [in billions]	Total Needed [in billions]
Fully Funded Improvements	\$ 14.2	\$ 0.0	\$ 14.2
Partially Funded Improvements	0.9	4.5	5.3
Unfunded Improvements	0.0	26.7	26.7
Total	\$ 15.1	\$ 31.2	\$ 46.3

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

Note: Totals may not equal 100% because of rounding.

The government that owns the infrastructure typically funds the bulk of its cost, and a variety of revenue sources are used. For example, the state collects taxes and appropriates funds to its own projects but also provides grants to local governments through programs in various state agencies. Even so, cities and counties fund most of their infrastructure improvements with their own property and sales tax revenues, while utility districts fund their improvements primarily with dedicated revenue sources in the form of user fees.

Because most of the state’s infrastructure needs are not included in this analysis, local government sources – mainly counties and cities – provide most of the capital for all the fully-funded needs presented here. Exceptions include transportation, which is funded primarily by the federal and state

governments. Industrial sites and parks also receive a substantial portion of funding from federal and state government. Broadband, recreation, storm water, housing, libraries, museums, and historic sites also rely on the federal government for significant portions of their reported funding (see table 5). It may appear that the state does not help pay for school buildings even though it does—although counties report funding 82.1% of new public school construction, the state provides an equivalent amount through its Basic Education Program (BEP) funding formula. The formula includes funds for capital outlay, an amount that topped \$788 million for fiscal year 2020-21.¹⁶ The state's share accounts for half of that amount, but those funds are not earmarked for that specific purpose; therefore, school systems have the flexibility to use those funds to meet various school needs,¹⁷ and some systems use them for operating costs rather than capital outlay.

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¹⁶ Copy of the Basic Education Program Funding Formula provided to TACIR Staff by the Department of Education on December 16, 2021.

¹⁷ Tennessee Comptroller of the Treasury. 2017. "Basic Education Program: A Funding Formula, Not A Spending Plan." <https://comptroller.tn.gov/content/dam/cot/orea/documents/bep/BEPFundingInfographic.pdf>.

Table 5. Funding Source by Category and Type of Infrastructure for Fully Funded Improvement Needs [in millions]
Five-Year Period July 2020 through June 2025

Category and Project Type	State		Federal		Other		City		County		Special District		Total	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
Transportation and Utilities	\$ 1,345.1	15.4%	\$ 4,939.5	56.4%	\$ 22.5	0.3%	\$ 968.3	11.1%	\$ 1,465.0	16.7%	\$ 9.9	0.1%	\$ 8,750.3	
Transportation	1,345.1	16.2%	4,931.0	59.3%	17.4	0.2%	553.6	6.7%	1,465.0	17.6%	0.0	0.0%	8,312.0	
Other Utilities	0.0	0.0%	4.5	1.0%	5.2	1.2%	411.8	95.5%	0.0	0.0%	9.8	2.3%	431.2	
Broadband	0.0	0.0%	4.0	57.1%	0.0	0.0%	3.0	42.9%	0.0	0.0%	0.0	0.0%	7.0	
Health, Safety and Welfare	\$ 21.3	0.5%	\$ 75.1	1.8%	\$ 57.2	1.4%	\$ 2,323.1	56.2%	\$ 1,419.9	34.4%	\$ 233.3	5.6%	\$ 4,130.0	
Water and Wastewater	13.6	0.4%	66.8	2.0%	36.3	1.1%	1,992.9	60.1%	988.7	29.8%	215.4	6.5%	3,313.7	
Law Enforcement	5.6	1.1%	0.5	0.1%	0.0	0.0%	124.9	24.6%	375.3	73.9%	1.5	0.3%	507.7	
Housing	0.0	0.0%	2.4	1.2%	20.9	10.2%	161.1	78.8%	4.0	2.0%	16.0	7.8%	204.4	
Fire Protection	0.0	0.0%	0.4	1.0%	0.0	0.0%	37.2	92.2%	2.8	6.9%	0.0	0.0%	40.4	
Public Health Facilities	1.1	2.4%	0.5	1.1%	0.0	0.0%	0.0	0.0%	42.9	96.5%	0.0	0.0%	44.5	
Storm Water	0.4	2.7%	4.6	35.2%	0.0	0.0%	6.6	50.5%	1.1	8.5%	0.4	3.1%	13.0	
Solid Waste	0.7	11.1%	0.0	0.0%	0.0	0.0%	0.5	7.2%	5.1	81.7%	0.0	0.0%	6.3	
Education	\$ 1.0	0.2%	\$ 2.5	0.5%	\$ 0.5	0.1%	\$ 59.3	11.4%	\$ 425.1	82.0%	\$ 30.3	5.8%	\$ 518.7	
Post-secondary Education	6.2	33.5%	0.8	4.2%	1.0	5.5%	6.5	35.2%	4.0	21.7%	0.0	0.0%	18.5	
New Public Schools	0.0	0.0%	0.0	0.0%	0.0	0.0%	58.3	11.8%	405.6	82.1%	30.3	6.1%	494.1	
School-System-wide	1.0	4.1%	2.5	10.3%	0.5	2.0%	1.0	4.1%	19.6	79.5%	0.0	0.0%	24.6	
Recreation and Culture	\$ 15.8	3.6%	\$ 105.9	24.4%	\$ 26.0	6.0%	\$ 190.1	43.9%	\$ 95.5	22.0%	\$ 0.0	0.0%	\$ 433.3	
Recreation	12.5	3.9%	94.2	29.8%	12.2	3.9%	119.3	37.8%	77.9	24.6%	0.0	0.0%	316.0	
Libraries, Museums, and Historic Sites	2.4	3.9%	6.8	10.9%	11.3	18.1%	27.0	43.1%	15.1	24.1%	0.0	0.0%	62.7	
Community Development	0.9	1.7%	4.9	8.9%	2.5	4.6%	43.8	80.3%	2.5	4.5%	0.0	0.0%	54.6	
Economic Development	\$ 40.0	30.5%	\$ 10.0	7.6%	\$ 5.2	3.9%	\$ 13.9	10.6%	\$ 60.9	46.4%	\$ 1.4	1.0%	\$ 131.3	
Industrial Sites and Parks	39.9	32.8%	9.2	7.6%	5.2	4.3%	4.9	4.1%	60.9	50.1%	1.4	1.1%	121.5	
Business District Development	0.1	1.0%	0.7	7.4%	0.0	0.0%	8.9	91.6%	0.0	0.0%	0.0	0.0%	9.7	
General Government	\$ 1.2	0.5%	\$ 0.9	0.4%	\$ 0.2	0.1%	\$ 77.3	32.0%	\$ 158.1	65.5%	\$ 3.9	1.6%	\$ 241.6	
Public Buildings	1.0	0.5%	0.9	0.4%	0.1	0.0%	54.2	26.6%	144.1	70.7%	3.6	1.8%	203.9	
Other Facilities	0.2	0.7%	0.0	0.0%	0.1	0.2%	23.0	61.1%	14.0	37.1%	0.4	0.9%	37.7	
Grand Total	\$ 1,424.4	10.0%	\$ 5,133.8	36.1%	\$ 111.6	0.8%	\$ 3,632.0	25.6%	\$ 3,624.5	25.5%	\$ 278.8	2.0%	\$ 14,205.1	

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