



# Report on Texas Bridges

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As of September 2016



# **Report on Texas Bridges**

## **As of September 2016**

**Prepared by the Bridge Division  
Texas Department of Transportation**

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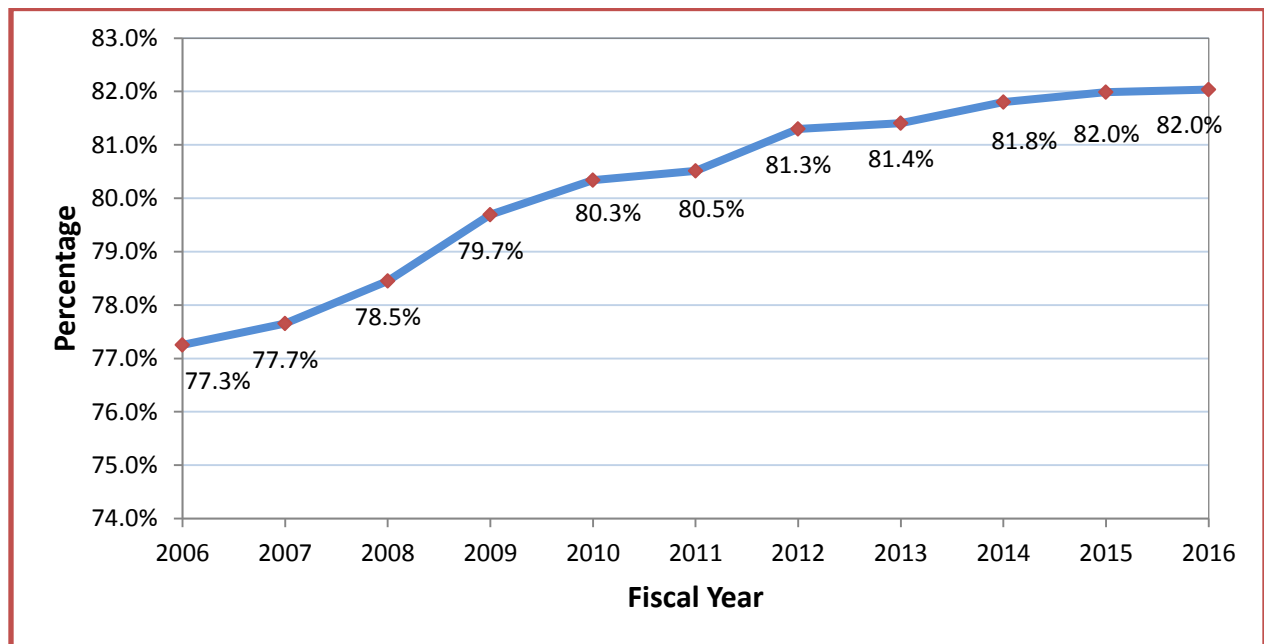
## Executive Summary

This report describes Texas’ publicly owned vehicular bridges and their condition as of September 2016. It describes bridges categorized by location either on or off the state highway system. It also describes the condition of Texas bridges in terms of sufficiency: bridges in good or better condition, structurally deficient bridges, functionally obsolete bridges, and substandard-for-load-only bridges.

This report outlines the funding sources and eligibility requirements of the Highway Bridge Program for on- and off-system bridges. It also illustrates TxDOT strategies to plan, build, use, maintain, and manage key state resources to ensure that Texas bridges are of high quality, cost-efficient, and safe.

In August 2001, TxDOT adopted a goal that within 10 years at least 80 percent of the bridges in Texas would be in good or better condition. TxDOT met this goal one year ahead of time. As Figures ES-1 and ES-2 illustrate, the percentage of bridges in good or better condition has continued to climb steadily over the past 10 years. As of September 2016, 82 percent, or 44,195 of the 53,875 bridges in Texas, had achieved a “good or better” rating.

**Percentage of “Good or Better” Texas Bridges, 2006 - 2016**



**Figure ES-1.**



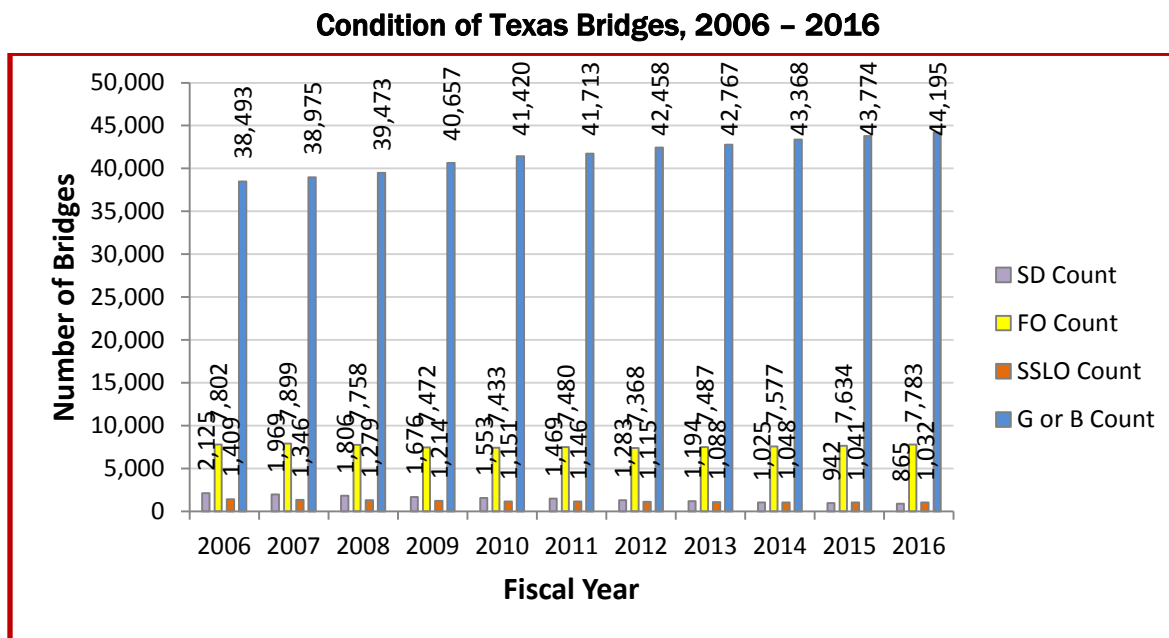


Figure ES-2.

### Contracting and Funds Spent

TxDOT spent a total of \$525.1 million in FY 2016 for on-system bridge maintenance, bridge replacement and rehabilitation, and construction of new-location bridges. This was distributed as follows:

- \$285.8 million (54%) for on-system new location
- \$192.1 million (37%) for on-system replacement/rehabilitation
- \$47.2 million (9%) for on-system maintenance

TxDOT spent a total of \$30.6 million in FY 2016 for off-system bridge replacement and rehabilitation, and construction of new-location bridges. This was distributed as follows:

- \$29.0 million (95%) for off-system replacement/rehabilitation
- \$1.6 million (5%) for new location

### Challenges and Solutions

The percentage of Average Daily Traffic (ADT) traveling on structurally deficient bridges in Texas is only 0.5 percent, the lowest in the nation.<sup>1</sup> By comparison, the national average is 4.6 percent. TxDOT will continue to work with communities and local, state and federal leaders to remain a national leader in bridge safety and cost-effectiveness, and to bring solid solutions to the infrastructure challenges that lie ahead.

<sup>1</sup> Deficient Bridges by Functional Classification / ADT 2000 - 2015, Federal Highway Administration's 2015 National Bridge Inventory. <https://www.fhwa.dot.gov/bridge/nbi/no10/fcadt15.cfm>

## Chapter 1 – Overview

### Introduction

The safety of the traveling public is the Texas Department of Transportation’s (TxDOT’s) number one priority. Texas enjoys a reputation as a national leader in bridge safety. Our state’s bridge system connects communities and allows citizens to experience a quality of life unique to Texas.

Texas maintains 53,875 bridges for public vehicular traffic—about 26,000 more bridges than any other state in the nation, and more than the combined inventories of 17 states. Nonetheless, only 1.9 percent of Texas bridges are structurally deficient, which is the second-lowest percentage of structurally deficient bridges in the nation.<sup>2</sup> The national average is 9.6 percent. This success is due, in part, to the Highway Bridge Program (HBP), which ensures that bridges are funded, designed, and maintained at the highest level of quality and as cost-effectively as possible.

Texas faces unprecedented mobility demands as the state’s population continues to grow at a rapid pace. At the same time, new developments in the energy economy have caused large-truck traffic to increase. These factors have tremendous impact on the state’s infrastructure and funding needs. TxDOT stands ready to take on these challenges. We are committed to developing innovative solutions and exploring new and more efficient technologies to make sure that Texas bridges are not only safe, but also best in class.

The Texas Transportation Commission has developed a plan to meet these challenges. On May 26, 2016, the Commission adopted TxDOT’s 2017 – 2021 Strategic Plan. It outlines the agency’s mission, values, goals, objectives, budgetary performance measures, strategies and planning information that will direct the department over the next five years.

### *Mission*

Through collaboration and leadership, we deliver a safe, reliable, and integrated transportation system that enables the movement of people and goods.

### *Strategic Goals*

1. Deliver the right projects
2. Focus on the customer
3. Foster stewardship
4. Optimize system performance
5. Preserve our assets
6. Promote safety
7. Value our employees

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<sup>2</sup> Deficient Bridges by Owner, Federal Highway Administration’s 2015 National Bridge Inventory. <http://www.fhwa.dot.gov/bridge/nbi/no10/owner15.cfm>

## Purpose

This report describes the condition of all publicly owned vehicular bridges in Texas as of September 15, 2016. It provides the following information:

- Chapter 2—Characteristics of Texas bridges, categorized by location on or off the state highway system and by age.
- Chapter 3—Condition of the bridges and changes from the preceding report.
- Chapter 4—Funding background and definitions.
- Chapter 5—Outlook for the future of Texas bridges based on their attributes and conditions. Summaries of progress made toward TxDOT's bridge goals during the preceding reporting period and our plan for staying on course.

Reports from 2002 – 2016 are available on the TxDOT website at <http://www.txdot.gov/government/reports/texas-bridges.html>.

This report was first published in 2002 in response to a new measure established by Texas Transportation Commissioner John W. Johnson to increase safety for the traveling public. This new measure required that within ten years, or by September 2011, at least 80% of the bridges in Texas be in good or better condition.<sup>3</sup>

As the 2002 – 2012 reports illustrate, TxDOT met its goal one year ahead of time to have 80 percent of bridges in good or better condition. Since that time, we have continued to reduce the number of structurally deficient bridges in our inventory.

## Data Sources

TxDOT maintains inspection information on each publicly owned vehicular bridge in the Bridge Inspection Database, a repository of information on the characteristics of the bridges and their conditions. It provides the source of data for descriptions of bridges in this report. The database identifies each bridge by its National Bridge Inventory (NBI) number and is updated continually based on biennial safety inspections.

TxDOT uses an automated information system—the Design and Construction Information System (DCIS)—for planning, programming, and developing projects. DCIS tracks information by work descriptions, funding requirements, and dates for proposed activities. DCIS also provides the source of information for project construction bids.

These resources provide a wealth of information about Texas bridges. In addition, TxDOT continually evaluates bridge information needs and is currently developing new ways to collect and retrieve data.

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<sup>3</sup> Texas Transportation Commission's Transportation Working Group, "Texas Transportation Partnerships: Connecting You to the World," August 2001.

## Chapter 2 – Characteristics of Texas Bridges

### Terms

Distinctive characteristics of publicly owned vehicular bridges include the following:

- *On-system or off-system:* On-system bridges are located on the designated state highway system, are maintained by TxDOT, and are typically funded with a combination of federal and state or state-only funds. Off-system bridges are not part of the designated state highway system and are under the direct jurisdiction of the local government such as a county, city, other political subdivision of the state, or special district with authority to finance a highway improvement project. This report classifies bridges as either on- or off-system.
- *Age:* This report classifies bridges by age according to significant historic changes in design criteria governing widths and live loads. Live loads are the moving weights placed on a bridge, not including the weight of the structure itself.

### Age

Older bridges require special maintenance and additional resources for bridge replacement and rehabilitation. In addition, on-system Texas bridges built after 1900 can be classified by significant changes in the design criteria that governed their construction:

- **Built before 1950:** Bridges generally designed for less than the current state legal load.
- **Built between 1950 and 1970:** Bridges generally required to accommodate the minimum design load or higher recommended by the American Association of State Highway and Transportation Officials, but may be narrower than their approach roadways. A number of these bridges are too narrow to meet current requirements. (Required bridge load capacity is described in detail in TxDOT's [Bridge Inspection Manual](#).)
- **Built after 1970:** Bridges generally required to accommodate the minimum design load or higher recommended by the American Association of State Highway and Transportation Officials, and must be at least as wide as their approach roadways.

Between 1950 and 1970, many new-location on-system bridges were built as the interstate system developed and the state highway system expanded. However, since 1970 the number of off-system bridges has increased at a faster rate. This is because additional new off-system roads and bridges are being built as many of the metropolitan and urban areas of Texas experience rapid growth. Tables 2-1, 2-2, and 2-3 show characteristics of bridges by age groupings.

**Age Distribution of Texas Bridge Population in FY 2006: Number of Bridges and Percent of Total by Year Constructed**

Year Built	On-System	Off-System	Total	Percent of Total
Before 1950	6,813	2,468	9,281	19%
1950 - 1970	13,784	3,553	17,337	35%
After 1970	12,076	11,132	23,208	47%
<b>Total</b>	<b>32,673</b>	<b>17,153</b>	<b>49,826</b>	<b>100%</b>

**Table 2-1.**

**Age Distribution of Texas Bridge Population in FY 2016: Number of Bridges and Percent of Total by Year Constructed**

Year Built	On-System	Off-System	Total	Percent of Total
Before 1950	6,394	1,704	8,098	15%
1950 - 1970	12,595	2,811	15,406	29%
After 1970	16,500	13,871	30,371	56%
<b>Total</b>	<b>35,489</b>	<b>18,386</b>	<b>53,875</b>	<b>100%</b>

**Table 2-2.**

**Change in Number of Bridges by Year Built, FY 2006 to FY 2016**

Year Built	Number of Bridges in 2006	Number of Bridges in 2016	Change in Number of Bridges
Before 1950	9,281	8,098	-1183
1950 - 1970	17,337	15,406	-1931
After 1970	23,208	30,371	7,163
<b>Total Number of Bridges</b>	<b>49,826</b>	<b>53,875</b>	<b>4,049</b>

**Table 2-3.**

As seen in the tables above, older bridges are being replaced with new structures. This is evidenced by the fact that as of FY 2016, 56 percent of all Texas bridges were built after 1970.

## Chapter 3 – Condition of Texas Bridges

### Terms

This report characterizes the condition of bridges as follows:

- **Good or better (GB) structure:** A good or better structure meets current federal and Texas requirements. It is not structurally deficient, functionally obsolete, or sub-standard for load only. Desirable change in good or better structures from year to year is reflected by positive numbers, showing an increase in sufficient structures.
- **Structurally deficient (SD) structure:** A bridge is classified by the Federal Highway Administration (FHWA) as structurally deficient if it meets any of the following criteria:
  - It has an extreme restriction on its load-carrying capacity.
  - It has deterioration severe enough to reduce its load-carrying capacity beneath its original as-built capacity.
  - It is closed.
  - It is frequently over-topped during flooding, creating severe traffic delays.
- **Functionally obsolete (FO) structure:** A bridge is classified by the FHWA as functionally obsolete if it fails to meet its design criteria in any one of the following areas:
  - Deck geometry
  - Load-carrying capacity
  - Vertical or horizontal clearances
  - Approach roadway alignment

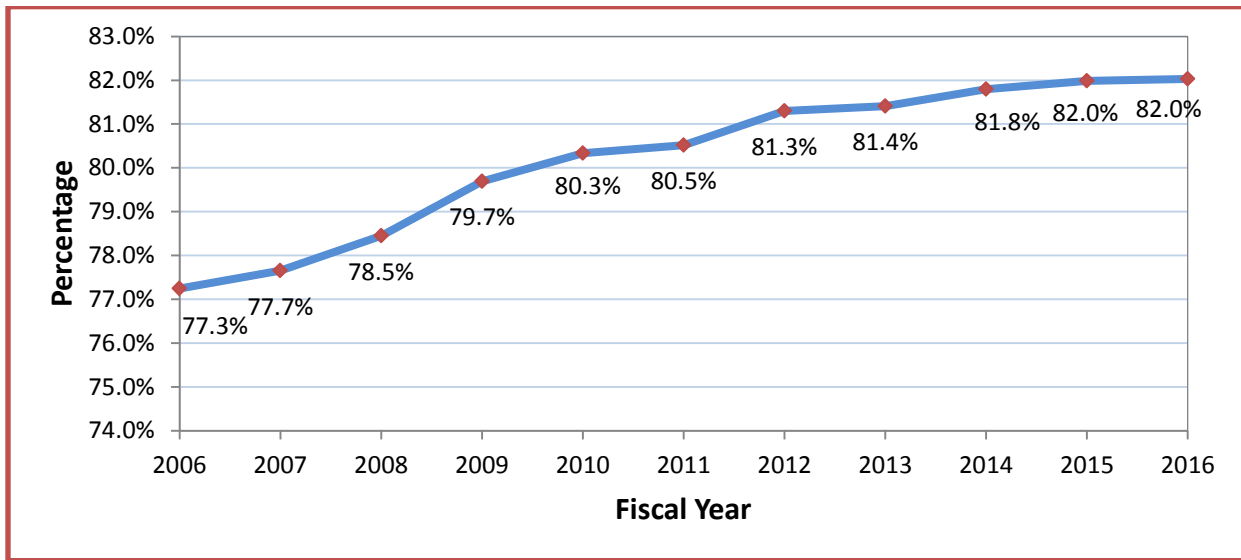
In this report, structures that are both functionally obsolete and structurally deficient are counted only as structurally deficient.

- **Sub-standard for load only (SSLO) structure:** A bridge is considered sub-standard for load only if it is not classified as structurally deficient or functionally obsolete, but has a load capacity less than the maximum load permitted by state law. It has not deteriorated or has not deteriorated severely enough to reduce its load capacity beneath its original as-built capacity, but its original as-built capacity was not designed to carry current legal loads. A sub-standard for load only structure is load-posted or recommended for load posting.
- **Load-posted bridge:** A bridge that is load-posted has a safe load capacity less than the state legal load, and its load capacity is communicated by signs at the bridge site. (Note: Certain vehicles, identified in Chapter 622 of the Texas Transportation Code, that exceed posted load capacity can legally use load-posted bridges.)
- **Land-locking bridge:** This report classifies a bridge as land-locking if it restricts traffic into an area because of load limitations or closures and no other public road into the area is capable of supporting legal loads. These bridges are load-posted or closed.

### Bridge Conditions

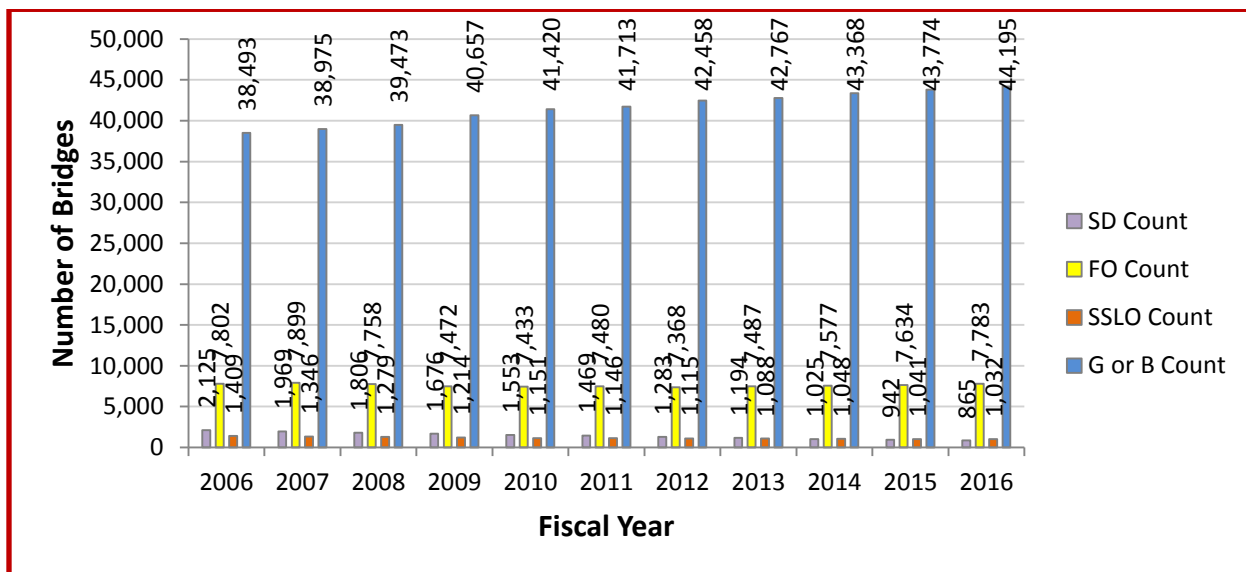
In August 2001, TxDOT adopted a goal that within 10 years at least 80 percent of the bridges in Texas would be in good or better condition. TxDOT met this goal one year ahead of time, and as Figures 3-1 and 3-2 illustrate, the percentage of bridges in good or better condition has continued to climb steadily over the past 10 years. As of September 2016, 82 percent, or 44,195 of the 53,875 bridges in Texas, had achieved a “good or better” rating.

**Percentage of "Good or Better" Texas Bridges, 2006 – 2016**



**Figure 3-1.**

**Condition of Texas Bridges, 2006 – 2016**

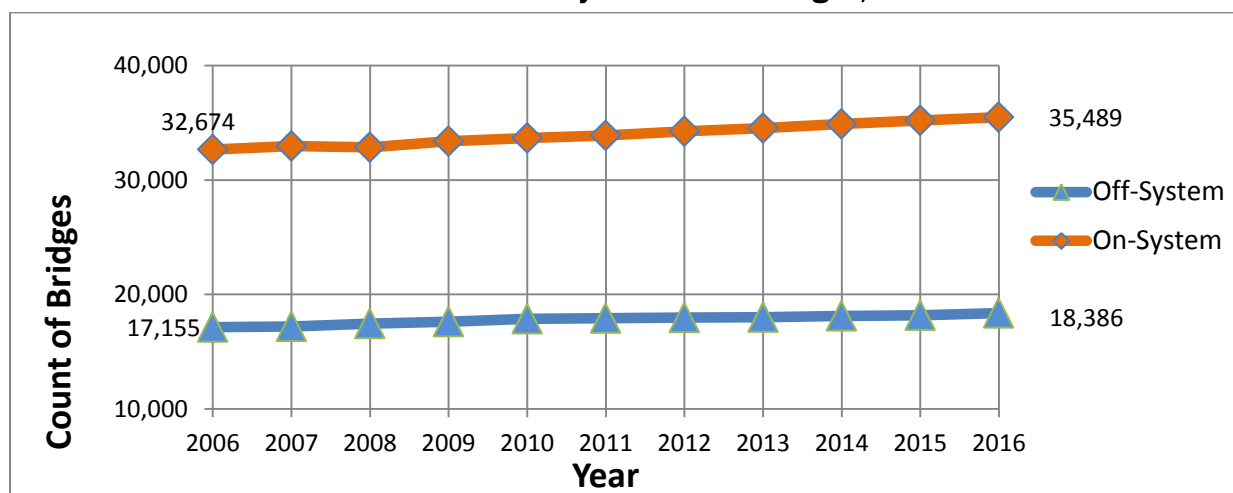


**Figure 3-2.**

### Change in Bridge Conditions Over Time

From 2006 – 2016, the number of on- and off-system Texas bridges increased as shown in Figure 3-3. We have the largest bridge inventory in the nation, with 53,875 bridges. During the same time period, Table 3-1 and Figure 3-4 illustrate a steady decrease in the number of bridges that were structurally deficient or sub-standard for load only, and a slight increase in the number of functionally obsolete bridges during the same time period.

**Total Count of On- and Off-System Texas Bridges, 2006 – 2016**



**Figure 3-3.**

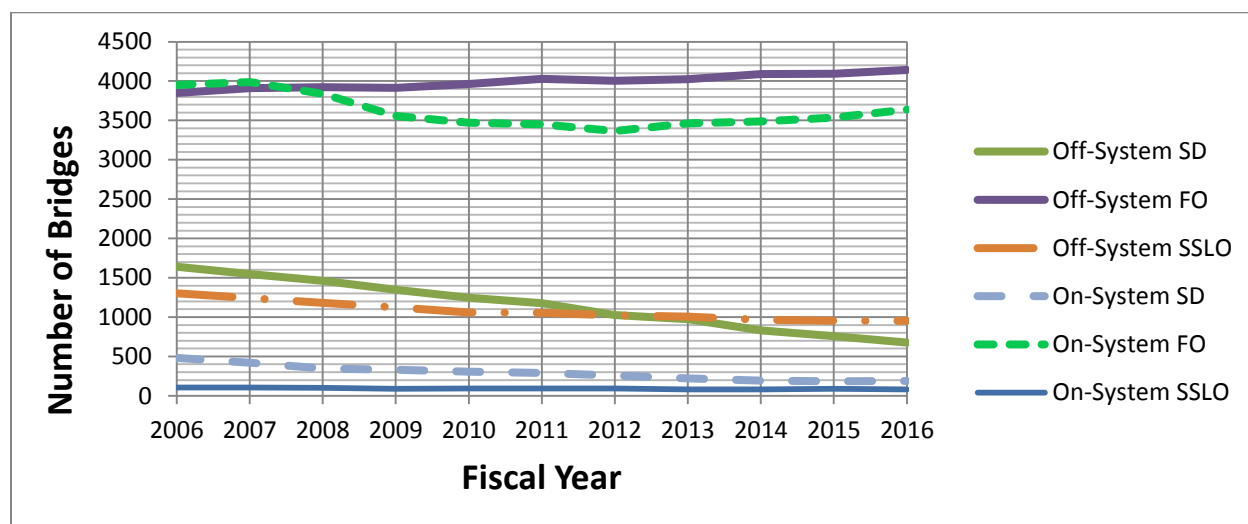
**SD, FO, and SSLO Bridges, 2006 – 2016**

Year	Off-System Total Count	Off-System SD	Off-System FO	Off-System SSLO	On-System Total Count	On-System SD	On-System FO	On-System SSLO
2006	17,155	1642	3851	1304	32,674	483	3951	105
2007	17,211	1548	3912	1240	32,978	421	3987	106
2008	17,454	1460	3922	1180	32,862	346	3836	99
2009	17,626	1347	3915	1124	33,393	329	3557	90
2010	17,878	1248	3962	1057	33,679	305	3471	94
2011	17,925	1178	4028	1055	33,883	291	3452	91
2012	17,969	1025	4003	1023	34,255	258	3365	92
2013	18,015	973	4025	1007	34,521	221	3462	81
2014	18,126	832	4091	966	34,892	193	3486	82
2015	18,177	759	4095	954	35,214	183	3537	87
2016	18,386	678	4144	952	35,489	187	3639	80

**Table 3-1.**



**SD, FO, and SSLO Bridges, 2006 – 2016**



**Figure 3-4.**

**Load-Posted and Closed Bridges**

Included within the categories of SD, FO, and SSLO bridges are load-posted and closed bridges. Totals as of September 2016 are shown in Table 3-2. Please note that the count of load-posted and closed bridges is included in the count of non-sufficient bridges above.

**Number of Bridges Load-Posted, Closed, or Recommended for Posting or Closure as of September 2016**

	On-System Bridges	Off-System Bridges
Total number of bridges closed to traffic or recommended for closure	18	115
Total number of bridges load-posted or recommended for load posting	178	2,077

**Table 3-2.**

Local governments are legally required to comply with a TxDOT bridge inspector’s request to load-post an off-system bridge. Federal law requires that load-posting signs be installed within 90 days of a change in status indicating deficiency of an on-system bridge and within 180 days of a change in status indicating deficiency of an off-system bridge. The process of posting an off-system bridge may take several months. First, TxDOT inspects the bridge, analyzes the inspection data, and makes a formal posting recommendation. Then, the local government acknowledges the request and arranges for fabrication of appropriate signs. To assist in this process and at the request of the local government, TxDOT will supply the signs and make them available to the local government for installation.

Local governments are encouraged but not legally required to comply with a request to close an off-system bridge. To encourage compliance, TxDOT uses its Participation-Waived Project/Equivalent Match Project (PWP/EMP) program, described in Chapter 4, to encourage compliance by local governments with recommendations for posting or closing off-system bridges. Local governments cannot participate in the PWP/EMP program until TxDOT confirms compliance with all requests to post or close off-system bridges in their jurisdiction.

## **Land-Locking Bridges**

Land-locking bridges limit the movement of legal loads into an area by imposing load restrictions or by being closed. TxDOT identifies a bridge or combination of bridges as land-locking only if no other public road into the area—and it must be a public road shown on a map maintained by TxDOT—is capable of supporting legal loads. As of September 2016, there were 428 land-locking bridges in Texas.

Chapter 621 of the Texas Transportation Code establishes the minimum load that unposted Texas bridges must be able to carry. Bridges unable to support that minimum load must be load-posted to protect them and the people who travel them from possible harm. The minimum load is the same as the state legal load. In general, the maximum gross load on a truck cannot exceed 80,000 pounds, the maximum load on tandem axles cannot exceed 34,000 pounds, and the maximum load on any single axle cannot exceed 20,000 pounds.

However, vehicles exceeding posted limits may use load-posted bridges under certain conditions. Pursuant to current Texas law, a carrier may obtain for a fee an annual weight tolerance permit. The permit allows for the transport of excess loads on a land-locking bridge if the bridge provides the only public vehicular access to or from the permittee's origin or destination. In addition, certain vehicles identified in Chapter 622 of the Texas Transportation Code that exceed posted load capacity but have a weight-tolerance permit also can legally use load-posted bridges. Examples include vehicles transporting concrete, timber, agricultural products, recyclable materials, or power poles, as well as vehicles with idle reduction systems. These exceptions can be found in Sections 622.012, 622.0435, 622.131, 622.133, and 622.955.

Vehicles that exceed posted limits but have a weight tolerance permit may legally use land-locking bridges. However, the use of land-locking bridges for excess loads increases the risk of damage to the bridge. The size, number, and weight of trucks on Texas roads and bridges are increasing, while at the same time, the bridge infrastructure is aging. Looking ahead, TxDOT will need to seek long-term solutions and funding to ensure the rehabilitation or replacement of load-posted and land-locking bridges in order to accommodate growing traffic demands.

## Chapter 4 – Funding

### MAP-21

MAP-21, the Moving Ahead for Progress in the 21st Century Act (P.L. 112-141), was signed into law by President Barack Obama on July 6, 2012. Funding surface transportation programs at over \$105 billion for fiscal years 2013 and 2014, MAP-21 is the first highway authorization enacted since 2005. The text and additional information on MAP-21 are available on the [FHWA's website](#).

MAP-21 restructures core highway formula programs. Activities carried out under some existing formula programs, including the Highway Bridge Program, are incorporated into the following new core formula program structure:

- National Highway Performance Program (NHPP)
- Surface Transportation Program (STP)
- Congestion Mitigation and Air Quality Improvement Program (CMAQ)
- Highway Safety Improvement Program (HSIP)
- Railway-Highway Crossings (set-aside from HSIP)
- Metropolitan Planning

While the previous federal Highway Bridge Program now has been incorporated into another core formula—NHPP—as of the writing of this report, TxDOT continues to administer the HBP as a state program, following the same rules and conditions as previously set out. The federal dollars under MAP-21 will continue to provide funding to enable states to improve the condition of their highway bridges through replacement, rehabilitation, systematic preventive maintenance and inspection.

### Unified Transportation Program

The TxDOT Unified Transportation Program (UTP) is a 10-year plan approved by the Texas Transportation Commission to guide transportation project development and construction. It contains 12 different categories of funding. Category 6 of the UTP is dedicated to bridge replacement and rehabilitation.

### Terms

This report uses the following terms to describe eligibility for funding of bridge projects under the state Highway Bridge Program (HBP):

*Category 6 on-system bridge projects:* This is a classification of replacement or rehabilitation work on structurally deficient or functionally obsolete *on-system* bridges that have a sufficiency rating of 80 or less and are, therefore, eligible for specific funding support under the HBP.

*Category 6 off-system bridge projects:* This is a classification of replacement or rehabilitation work on structurally deficient or functionally obsolete *off-system* bridges that have a sufficiency rating of 80 or less and are, therefore, eligible for specific funding support under the HBP.

*Programmed project:* A programmed project is a project that has been identified as eligible for funding (for example, under HBP), prioritized using specific TxDOT and federal criteria, and listed in the current UTP as being authorized for letting to contract. Programmed projects are scheduled for letting of construction bids for a specific fiscal year.

*Sufficiency rating:* This is a numerical evaluation established by the FHWA. It measures a bridge's structural adequacy and safety, serviceability and functional obsolescence, and essentiality for traffic service. The higher the number, the more sufficient the bridge. The rating is used to determine whether a bridge project is eligible for HBP rehabilitation or replacement. A bridge must be structurally deficient or functionally obsolete and have a sufficiency rating less than 80 to be eligible for the HBP. A sufficiency rating of 80 or less is required to qualify for rehabilitation, and a sufficiency rating of less than 50 is required to qualify for replacement. A structurally deficient bridge with a sufficiency rating between 50 and 80 may qualify for replacement if justified by engineering or economic analysis. The lower the number, the higher the priority.

## **Highway Bridge Program Funding**

TxDOT administers the state HBP by selecting bridge projects for funding according to various eligibility criteria, including but not limited to structural deficiency and functional obsolescence. Once eligible projects are identified, the structurally deficient and functionally obsolete bridges are ordered by sufficiency rating and included in the program list until available funding is exhausted. Finally, the projects are authorized using the UTP or, in its absence, by Commission Minute Order.

## **On-System Bridge Projects Authorized to be Awarded Contracts**

TxDOT authorized the following classes of on-system bridge projects to be awarded contracts in FY 2014 through FY 2016:

- HBP-funded projects (UTP Category 6-on-system)
- Replacement and rehabilitation projects not funded under HBP (that is, these bridges are not necessarily structurally deficient or functionally obsolete, and the projects are funded under other funding categories)
- New-location bridge projects funded under other categories of funding

## Off-System Bridge Projects Authorized to be Awarded Contracts

The following classes of off-system bridge projects were funded in FY 2014 through FY 2016:

- HBP-funded project (UTP Category 6-off-system)
- Replacement and rehabilitation projects not funded under HBP (that is, these bridges are not necessarily structurally deficient or functionally obsolete)
- New-location bridge projects not funded with Category 6 funds.

## PWP/EMP Program

In FY 2001, TxDOT initiated its Participation-Waived Project/Equivalent-Match Project (PWP/EMP) program to allow a local government to waive its 10% cost participation requirement in an HBP off-system bridge project if it agrees to use an equivalent dollar amount to improve other deficient structures in its jurisdiction.<sup>4</sup> In addition to HBP-programmed bridges, EMP work may be performed on bridge structures that are not part of the National Bridge Inventory.

## Other Funding Resources for Off-System Bridge Work

Texas provides additional resources for local governments to facilitate the improvement of off-system bridges, and those resources include the following:

- The [State Infrastructure Bank \(SIB\)](#) is a revolving account in the State Highway Fund from which TxDOT may award loans to local governments to fund eligible transportation projects.
- TxDOT's Economically Disadvantaged Counties (EDC) Program allows TxDOT to adjust a county's matching funds requirements after evaluating the local government's ability to meet the requirement. TxDOT also allows a county participating in the EDC program to use its adjusted participation amount in lieu of all or part of its cost participation in the PWP/EMP program. More information on this program is available in TxDOT's [Bridge Project Development Manual](#) and in TxDOT's [Transportation Planning Manual](#).

## Summary of FY 2016 Funds Spent on On- and Off-System Bridges

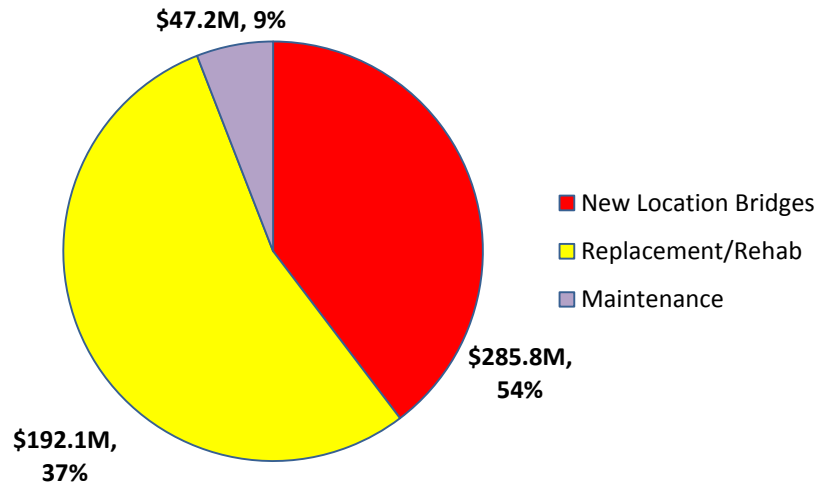
Figures 4-1 and 4-2 show the distribution of money spent in FY 2016 for the maintenance, replacement and rehabilitation, and construction of new-location on- and off-system bridges,

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<sup>4</sup> A November 2001 amendment to the PWP/EMP program expanded the safety-improvement types of work that may be classified as EMP projects and allowed local governments to receive EMP credit for work performed in geographically adjacent governmental units.

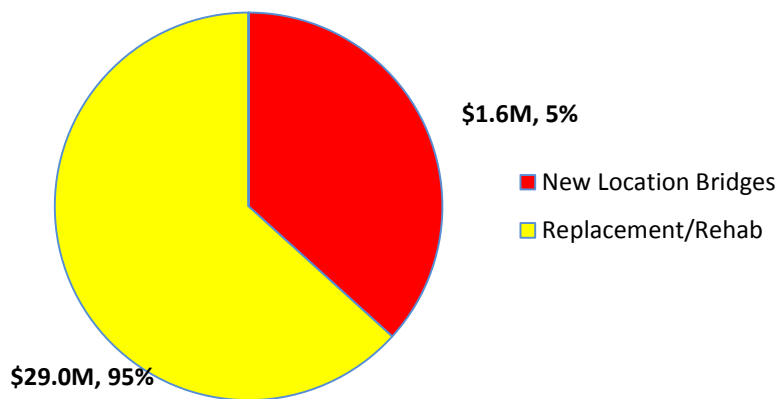
respectively.<sup>5</sup> As noted previously, state funds are not used for the maintenance of off-system bridges.

**Distribution of Funds Spent on On-System Bridges in FY 2016 (\$525.1 M Total)**



**Figure 4-1.**

**Distribution of Funds Spent on Off-System Bridges in FY 2016 (\$30.6 M Total)**



**Figure 4-2.**

<sup>5</sup> Totals reflect letting costs of bridge items only. They do not include costs for approach roadway work, traffic control, removal of existing bridge, or other non-structural items.

## Chapter 5 – Meeting the Challenges

### Bridge Condition Success

In August 2001, TxDOT adopted a goal that within 10 years, or by the end of 2011, at least 80% of the bridges in Texas would be in good or better condition. Additionally, TxDOT adopted a goal to accelerate the upgrade and reduction of structurally deficient on-system bridges.

TxDOT met its goal one year ahead of time to have 80% of bridges in good or better condition, with 80.5% of Texas bridges in good or better condition in 2010. That percentage continued to rise, reaching 81.8% in 2014 and climbing to 82.0% in 2016. In addition, TxDOT has made steady, consistent progress toward reducing on-system structurally deficient bridges. The number has dropped from 483 in 2006, to 187 in 2016, despite the fact that the overall inventory of on-system bridges has increased during that time from 32,674 to 35,489. The number of structurally deficient off-system bridges has decreased at an even greater rate—from 1,642 to 678—during the same time period.

As a result of meeting and surpassing these goals, only 1.9% of Texas' bridges are structurally deficient. This ranks Texas #2 in the nation among states with the smallest percentage of structurally deficient bridges.<sup>6</sup>

### Current Challenges

#### *Population Growth and Mobility Demands*

TxDOT faces unprecedented population growth and mobility demands: Texas has experienced a 24% increase in population since 2000 and is one of the most rapidly growing states in the country.<sup>7</sup> At the same time, the increase in oversize-overweight vehicles and loads is placing wear and tear on roads and bridges at a more rapid rate than ever before. According to the Texas Department of Motor Vehicles, 665,578 oversize-overweight permits were issued in FY2016 alone.

An additional challenge is the need to invest in the state's aging transportation infrastructure. Many bridges, for example, were built between 1950 and 1970 as the interstate system developed and the state highway system expanded. In July 2010, Texas Transportation Chair Deirdre Delisi reconvened the 2030 Committee, which had previously issued a report in 2009 outlining the state's transportation infrastructure and mobility needs. Building on its earlier research, in 2011 the 2030 Committee issued a [report](#) entitled

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<sup>6</sup> Deficient Bridges by Owner, Federal Highway Administration's 2015 National Bridge Inventory. <http://www.fhwa.dot.gov/bridge/nbi/no10/owner15.cfm>

<sup>7</sup> U.S. Census Bureau, 2000 and 2010 Census. <http://www.census.gov/prod/cen2010/briefs/c2010br-01.pdf>

*It's About Time: Investing in Transportation to Keep Texas Economically Competitive*, which forecast alternative levels of service for four elements of the Texas transportation system—including bridges—and determined the economic effects of under-investing in the system. According to the report, the cost to repair the backlog of deficient bridges will increase from \$3 billion in 2010 to \$7 billion in 2035.

If not addressed through additional funding, the pace of growth and change could threaten to reverse the steady improvement in bridge conditions that Texas has enjoyed since 2001. One indicator is that despite having the second-lowest percentage of structurally deficient bridges in the nation, in 2015 Texas ranked #14 among all states with the smallest combined percentage of SD and functionally obsolete (FO) bridges.<sup>8</sup> This is largely attributable to the fact that rapid population growth results in more daily traffic, which increases the rate at which bridges become FO and need to be replaced or improved.

### *Load-Posted Bridges*

Currently there are 178 on-system and 2,077 off-system bridges that are load posted or have been recommended for load posting. While these structures are safe, they are incapable of carrying the state legal loads. These bridges have been load posted because it is impractical to close them from a mobility standpoint, and because TxDOT lacks funds to replace or rehabilitate them. While these 2,255 bridges make up less than 5% of all bridges in the state, they represent approximately \$1.4 billion in needed funding.

While many of these bridges are rated as Structurally Deficient or Functionally Obsolete, thereby making them eligible for the Highway Bridge Program, nearly half of them are Substandard for Load Only, which are not eligible. Eighty on-system and 952 off-system bridges fall into this category. The estimate to replace or rehabilitate these bridges to carry state legal loads exceeds \$731 million. There currently are no dedicated funding mechanisms available to TxDOT to address these needs.

Load-posted bridges restrict commerce, since many vehicles have to take alternate routes in order to avoid traversing them. The presence of load-posted bridges on a given route often impacts school bus routes and the availability of emergency services.

### *Land-Locking Bridges*

Vehicles that exceed posted limits but have a weight-tolerance permit may legally use land-locking bridges. However, the use of land-locking bridges for excess loads increases the risk of damage to the bridge. The size, number, and weight of trucks on Texas roads and bridges is increasing, while at the same time, the bridge infrastructure is aging. TxDOT will need to

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<sup>8</sup> Deficient Bridges by County, The Federal Highway Administration's 2015 National Bridge Inventory. <http://www.fhwa.dot.gov/bridge/nbi/no10/county.cfm>



seek long-term solutions and funding to ensure the rehabilitation or replacement of load-posted and land-locking bridges in order to accommodate traffic demands.

## **Funding Needs**

Texas faces enormous and rapidly increasing transportation needs, with no quick and easy solutions to meet them. Demand is outpacing funding. Factors including inflation, a growing population, an aging infrastructure, and more fuel-efficient vehicles—which provide environmental benefits but result in less revenue from the motor fuel tax—are pushing current funding sources to their limits.

From 2017 to 2026, the percent of Good or Better bridges is projected to increase from 82% to 82.75%. During the same time period, the combined percentage of bridges rated as Structurally Deficient (SD), Substandard for Load Only (SSLO), and Functionally Obsolete (FO) is projected to decrease from 18% to 17%. However, the overall bridge inventory is projected to increase from 54,286 in 2017 to 57,985 in 2026. As the bridge inventory grows, the total number of bridges rated as SD, SSLO, and FO is projected to increase slightly. By 2026, it is estimated that 10,011 bridges will require funding for rehabilitation or replacement.

Following below are three programs that are critical to ensuring the future safety of Texas bridges and for which there currently exists either limited or no funding.

### *Rail Replacement Program*

The goal of the Rail Replacement Program (RRP) is to improve safety on bridges and bridge-class culverts that are in good condition but have traffic safety features that do not comply with the current standards. TxDOT is taking proactive measures to replace non-compliant rails in order to improve driver safety. Our current annual budget of \$5 million allows us to replace approximately 35 deficient bridge rails with an average RRP project cost of \$150,000 per bridge every year. There are 13,680 on-system deficient bridge rails that are eligible for the RRP. Of those eligible, 3,269 have an annual average daily traffic (AADT) total that exceeds 10,000 vehicles per day. The present worth total to replace these high-traffic bridge rails is \$490 million.

With the current budget of \$5 million annually, it will take 98 years to address all of the rails on high-AADT bridges. With \$20 million annually, however, TxDOT's expectations for full on-system rail compliance on these high-traffic bridges could be met in 25 years.

### *Railroad Grade Separation Program*

The goal of the Railroad Grade Separation (RGS) Program is to improve safety at highway-railroad at-grade crossings to prevent collisions between vehicles and trains, and to replace existing railroad underpasses that are too narrow or have a low vertical clearance. RGS

funding has been fixed at \$20 million per year for many years. An average RGS project costs about \$20 million; therefore, the current funding is enough for only one project per year. About 40 of the highest priority highway-railroad projects have been identified. These 40 projects alone have an estimated cost of \$800 million. By tripling the current annual funding from \$20 million to \$60 million, these projects could be completed in about 14 years instead of 40 years.

### *Narrow Bridge Program*

A narrow bridge is defined as a bridge roadway width of less than 24 feet wide. The Narrow Bridge Program would address all on-system bridges and bridge-class culverts that are narrow and not eligible for HBP funding. There are a total of 1870 candidate bridges for this program. The costs provided are for the bridge construction only, not the roadway work, needed to bring the bridge roadway width to 28 feet to meet the Roadway Design Manual (RDM) requirements. Depending on the structure's condition, it would either be widened or replaced.

Candidates were prioritized into 4 tiers based on several features including roadway width, energy sector, AADT, truck traffic, and operating status. Tier 1 with a total of 463 bridges is the highest priority of narrow bridges and could be addressed with \$65 million annually for two years. Overall, with \$62.5 million annually, we could remove all narrow bridges from the on-system transportation system over a 10-year period.

### **Looking Ahead**

TxDOT will continue to maximize the use of funds made available for bridge preservation and replacement. The agency also will continue to explore, develop and implement creative programs to improve Texas bridges. In addition, TxDOT is committed to using all of the financial tools made available to it by the Texas Legislature in order to meet its goals.

Going forward, TxDOT's bridge programs and work will support the goals and priorities of the [TxDOT 2017 – 2021 Strategic Plan](#). The [Texas Transportation Plan 2040](#) and [Texas Freight Mobility Plan](#) serve as additional roadmaps. TxDOT continually monitors its performance against the principles, measures and goals set out in this report. We will continue to work together with the Legislature and local governments to maximize efficiencies and use all the financial tools available to improve the bridges in Texas and ensure the safety of the traveling public.

### Appendix A – Map of Texas Counties with TxDOT Districts

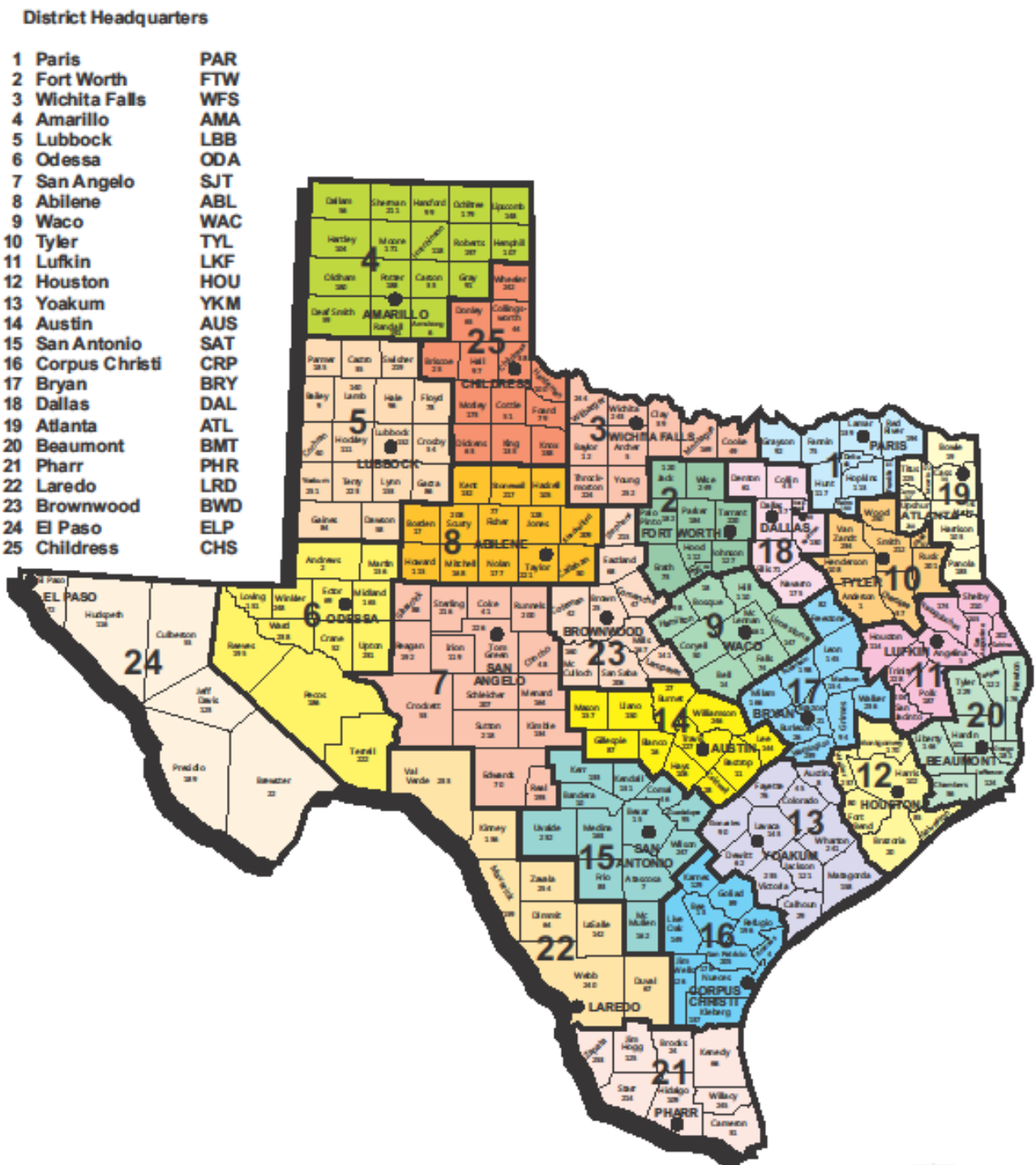


Figure A-1. Map of Texas Counties with TxDOT Districts

### Appendix B – Condition of On-System Bridges by TxDOT District and County as of September 2016

Number of Bridges by Condition							
District Name	County	Total Bridges On System	On- System SD	On- System FO	On- System SSLO	Number of On- System Good or Better Bridges	On- System Percent Good or Better
<b>Abilene</b>							
	Borden	49	0	0	1	48	98.0%
	Callahan	138	0	3	0	135	97.8%
	Fisher	78	1	6	2	69	88.5%
	Haskell	67	0	3	0	64	95.5%
	Howard	118	0	20	0	98	83.1%
	Jones	117	0	2	0	115	98.3%
	Kent	25	0	1	0	24	96.0%
	Mitchell	116	3	27	3	83	71.6%
	Nolan	131	3	13	0	115	87.8%
	Scurry	95	1	6	0	88	92.6%
	Shackelford	67	0	1	2	64	95.5%
	Stonewall	35	1	0	0	34	97.1%
	Taylor	326	3	37	0	286	87.7%
<b>District Total</b>		<b>1362</b>	<b>12</b>	<b>119</b>	<b>8</b>	<b>1223</b>	<b>89.8%</b>
<b>Amarillo</b>							
	Armstrong	11	0	0	0	11	100.0%
	Carson	33	0	2	0	31	93.9%
	Dallam	22	0	0	0	22	100.0%
	Deaf Smith	22	0	3	0	19	86.4%
	Gray	58	0	3	0	55	94.8%
	Hansford	30	0	3	0	27	90.0%
	Hartley	17	1	0	0	16	94.1%
	Hemphill	31	0	0	0	31	100.0%
	Hutchinson	40	0	1	0	39	97.5%
	Lipscomb	36	0	0	0	36	100.0%
	Moore	24	1	1	0	22	91.7%
	Ochiltree	24	0	3	0	21	87.5%
	Oldham	51	0	1	0	50	98.0%
	Potter	163	11	20	0	132	81.0%
	Randall	86	0	11	0	75	87.2%
	Roberts	21	1	0	0	20	95.2%
	Sherman	25	0	0	0	25	100.0%
<b>District Total</b>		<b>694</b>	<b>14</b>	<b>48</b>	<b>0</b>	<b>632</b>	<b>91.1%</b>

Number of Bridges by Condition							
District Name	County	Total Bridges On System	On-System SD	On-System FO	On-System SSLO	Number of On-System Good or Better Bridges	On-System Percent Good or Better
<b>Atlanta</b>							
	Bowie	257	0	10	0	247	96.1%
	Camp	36	0	0	0	36	100.0%
	Cass	133	1	4	0	128	96.2%
	Harrison	212	0	3	0	209	98.6%
	Marion	46	1	4	0	41	89.1%
	Morris	49	0	2	0	47	95.9%
	Panola	125	0	0	0	125	100.0%
	Titus	113	0	11	0	102	90.3%
	Upshur	130	0	2	0	128	98.5%
<b>District Total</b>		<b>1101</b>	<b>2</b>	<b>36</b>	<b>0</b>	<b>1063</b>	<b>96.5%</b>
<b>Austin</b>							
	Bastrop	137	1	9	0	127	92.7%
	Blanco	55	0	8	4	43	78.2%
	Burnet	83	0	16	2	65	78.3%
	Caldwell	152	1	9	2	140	92.1%
	Gillespie	92	0	13	0	79	85.9%
	Hays	135	0	18	0	117	86.7%
	Lee	66	0	13	1	52	78.8%
	Llano	76	2	8	0	66	86.8%
	Mason	75	2	6	0	67	89.3%
	Travis	731	2	152	0	577	78.9%
	Williamson	463	1	56	0	406	87.7%
<b>District Total</b>		<b>2065</b>	<b>9</b>	<b>308</b>	<b>9</b>	<b>1739</b>	<b>84.2%</b>
<b>Beaumont</b>							
	Chambers	118	1	10	0	107	90.7%
	Hardin	118	0	5	0	113	95.8%
	Jasper	134	2	10	0	122	91.0%
	Jefferson	281	4	77	0	200	71.2%
	Liberty	151	2	3	0	146	96.7%
	Newton	114	2	13	0	99	86.8%
	Orange	110	2	6	0	102	92.7%
	Tyler	74	0	6	0	68	91.9%
<b>District Total</b>		<b>1100</b>	<b>13</b>	<b>130</b>	<b>0</b>	<b>957</b>	<b>87.0%</b>
<b>Brownwood</b>							
	Brown	127	0	2	0	125	98.4%
	Coleman	106	0	3	0	103	97.2%

Number of Bridges by Condition							
District Name	County	Total Bridges On System	On-System SD	On-System FO	On-System SSLO	Number of On-System Good or Better Bridges	On-System Percent Good or Better
	Comanche	116	2	9	1	104	89.7%
	Eastland	170	1	6	2	161	94.7%
	Lampasas	76	1	2	1	72	94.7%
	Mcculloch	93	0	3	1	89	95.7%
	Mills	53	0	3	0	50	94.3%
	San Saba	69	0	2	0	67	97.1%
	Stephens	83	0	1	1	81	97.6%
<b>District Total</b>		<b>893</b>	<b>4</b>	<b>31</b>	<b>6</b>	<b>852</b>	<b>95.4%</b>
<b>Bryan</b>							
	Brazos	207	0	17	0	190	91.8%
	Burleson	76	0	11	0	65	85.5%
	Freestone	117	0	23	0	94	80.3%
	Grimes	120	2	15	0	103	85.8%
	Leon	131	1	9	0	121	92.4%
	Madison	103	0	21	0	82	79.6%
	Milam	126	2	17	0	107	84.9%
	Robertson	97	0	8	0	89	91.8%
	Walker	117	0	14	1	102	87.2%
	Washington	100	1	9	0	90	90.0%
<b>District Total</b>		<b>1194</b>	<b>6</b>	<b>144</b>	<b>1</b>	<b>1043</b>	<b>87.4%</b>
<b>Childress</b>							
	Briscoe	14	0	0	0	14	100.0%
	Childress	67	0	2	0	65	97.0%
	Collingsworth	46	0	5	0	41	89.1%
	Cottle	55	0	5	0	50	90.9%
	Dickens	61	0	1	0	60	98.4%
	Donley	60	0	2	0	58	96.7%
	Foard	49	0	1	1	47	95.9%
	Hall	91	0	3	1	87	95.6%
	Hardeman	54	0	2	0	52	96.3%
	King	40	0	0	0	40	100.0%
	Knox	44	0	0	0	44	100.0%
	Motley	43	0	2	0	41	95.4%
	Wheeler	86	1	3	2	80	93.0%
<b>District Total</b>		<b>710</b>	<b>1</b>	<b>26</b>	<b>4</b>	<b>679</b>	<b>95.6%</b>

Number of Bridges by Condition							
District Name	County	Total Bridges On System	On-System SD	On-System FO	On-System SSLO	Number of On-System Good or Better Bridges	On-System Percent Good or Better
<b>Corpus Christi</b>							
	Aransas	17	0	0	0	17	100.0%
	Bee	109	1	4	2	102	93.6%
	Goliad	82	1	10	1	70	85.4%
	Jim Wells	144	1	9	0	134	93.1%
	Karnes	103	1	18	1	83	80.6%
	Kleberg	53	0	2	1	50	94.3%
	Live Oak	203	0	13	0	190	93.6%
	Nueces	331	0	29	1	301	90.9%
	Refugio	107	2	7	0	98	91.6%
	San Patricio	185	0	7	0	178	96.2%
<b>District Total</b>		<b>1334</b>	<b>6</b>	<b>99</b>	<b>6</b>	<b>1223</b>	<b>91.7%</b>
<b>Dallas</b>							
	Collin	413	1	76	3	333	80.6%
	Dallas	1645	8	463	1	1173	71.3%
	Denton	465	5	82	2	376	80.9%
	Ellis	463	1	69	0	393	84.9%
	Kaufman	381	4	50	0	327	85.8%
	Navarro	236	2	32	0	202	85.6%
	Rockwall	56	0	12	0	44	78.6%
<b>District Total</b>		<b>3659</b>	<b>21</b>	<b>784</b>	<b>6</b>	<b>2848</b>	<b>77.8%</b>
<b>El Paso</b>							
	Brewster	91	0	1	0	90	98.9%
	Culberson	134	0	1	0	133	99.3%
	El Paso	467	2	70	0	395	84.6%
	Hudspeth	130	0	6	0	124	95.4%
	Jeff Davis	134	0	12	0	122	91.0%
	Presidio	73	0	3	0	70	95.9%
<b>District Total</b>		<b>1029</b>	<b>2</b>	<b>93</b>	<b>0</b>	<b>934</b>	<b>90.8%</b>
<b>Fort Worth</b>							
	Erath	124	1	2	0	121	97.6%
	Hood	60	0	5	0	55	91.7%
	Jack	76	0	2	2	72	94.7%
	Johnson	252	1	25	1	225	89.3%
	Palo Pinto	182	1	4	2	175	96.2%
	Parker	167	3	11	0	153	91.6%

Number of Bridges by Condition							
District Name	County	Total Bridges On System	On-System SD	On-System FO	On-System SSLO	Number of On-System Good or Better Bridges	On-System Percent Good or Better
	Somervell	26	0	4	0	22	84.6%
	Tarrant	1310	8	175	2	1125	85.9%
	Wise	132	0	8	0	124	93.9%
<b>District Total</b>		<b>2329</b>	<b>14</b>	<b>236</b>	<b>7</b>	<b>2072</b>	<b>89.0%</b>
<b>Houston</b>							
	Brazoria	316	2	9	0	305	96.5%
	Fort Bend	301	1	21	0	279	92.7%
	Galveston	195	1	27	0	167	85.6%
	Harris	1989	12	473	0	1504	75.6%
	Montgomery	300	3	8	0	289	96.3%
	Waller	123	1	7	0	115	93.5%
<b>District Total</b>		<b>3224</b>	<b>20</b>	<b>545</b>	<b>0</b>	<b>2659</b>	<b>82.5%</b>
<b>Laredo</b>							
	Dimmit	72	0	5	0	67	93.1%
	Duval	117	0	0	0	117	100.0%
	Kinney	36	0	2	0	34	94.4%
	La Salle	109	0	6	0	103	94.5%
	Maverick	96	0	2	0	94	97.9%
	Val Verde	99	0	7	0	92	92.9%
	Webb	267	0	15	0	252	94.4%
	Zavala	71	0	8	0	63	88.7%
<b>District Total</b>		<b>867</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>822</b>	<b>94.8%</b>
<b>Lubbock</b>							
	Bailey	4	0	0	0	4	100.0%
	Castro	10	0	1	0	9	90.0%
	Cochran	0	0	0	0	0	N/A
	Crosby	12	0	0	0	12	100.0%
	Dawson	3	0	0	0	3	100.0%
	Floyd	10	0	2	0	8	80.0%
	Gaines	0	0	0	0	0	N/A
	Garza	50	0	0	0	50	100.0%
	Hale	46	0	5	0	41	89.1%
	Hockley	3	0	0	0	3	100.0%
	Lamb	11	0	0	0	11	100.0%
	Lubbock	221	2	31	0	188	85.1%
	Lynn	5	0	2	0	3	60.0%



Number of Bridges by Condition							
District Name	County	Total Bridges On System	On-System SD	On-System FO	On-System SSLO	Number of On-System Good or Better Bridges	On-System Percent Good or Better
	Parmer	21	0	0	0	21	100.0%
	Swisher	66	0	0	0	66	100.0%
	Terry	5	0	0	0	5	100.0%
	Yoakum	0	0	0	0	0	N/A
<b>District Total</b>		<b>467</b>	<b>2</b>	<b>41</b>	<b>0</b>	<b>424</b>	<b>90.8%</b>
<b>Lufkin</b>							
	Angelina	111	0	8	2	101	91.0%
	Houston	97	1	4	0	92	94.9%
	Nacogdoches	128	1	21	3	103	80.5%
	Polk	118	1	9	0	108	91.5%
	Sabine	63	0	2	0	61	96.8%
	San Augustine	72	2	5	0	65	90.3%
	San Jacinto	53	0	7	0	46	86.8%
	Shelby	103	0	4	0	99	96.1%
	Trinity	58	1	6	0	51	87.9%
<b>District Total</b>		<b>803</b>	<b>6</b>	<b>66</b>	<b>5</b>	<b>726</b>	<b>90.4%</b>
<b>Odessa</b>							
	Andrews	1	0	0	0	1	100.0%
	Crane	18	0	0	0	18	100.0%
	Ector	113	0	4	0	109	96.5%
	Loving	4	0	0	0	4	100.0%
	Martin	14	1	0	0	13	92.9%
	Midland	97	0	7	1	89	91.8%
	Pecos	466	0	1	0	465	99.8%
	Reeves	208	3	6	0	199	95.7%
	Terrell	53	0	0	1	52	98.1%
	Upton	39	0	0	0	39	100.0%
	Ward	54	2	3	0	49	90.7%
	Winkler	1	0	0	0	1	100.0%
<b>District Total</b>		<b>1068</b>	<b>6</b>	<b>21</b>	<b>2</b>	<b>1039</b>	<b>97.3%</b>
<b>Paris</b>							
	Delta	68	1	4	2	61	89.7%
	Fannin	164	2	12	0	150	91.5%
	Franklin	50	0	2	0	48	96.0%

Number of Bridges by Condition							
District Name	County	Total Bridges On System	On-System SD	On-System FO	On-System SSLO	Number of On-System Good or Better Bridges	On-System Percent Good or Better
	Grayson	264	0	32	0	232	87.9%
	Hopkins	176	4	15	0	157	89.2%
	Hunt	310	1	23	3	283	91.3%
	Lamar	176	0	15	2	159	90.3%
	Rains	34	1	1	0	32	94.1%
	Red River	119	2	2	5	110	92.4%
<b>District Total</b>		<b>1361</b>	<b>11</b>	<b>106</b>	<b>12</b>	<b>1232</b>	<b>90.5%</b>
<b>Pharr</b>							
	Brooks	45	0	0	0	45	100.0%
	Cameron	242	1	13	0	228	94.2%
	Hidalgo	242	2	27	0	213	88.0%
	Jim Hogg	29	0	0	0	29	100.0%
	Kenedy	17	0	0	0	17	100.0%
	Starr	50	0	1	0	49	98.0%
	Willacy	61	0	2	0	59	96.7%
	Zapata	37	0	4	0	33	89.2%
<b>District Total</b>		<b>723</b>	<b>3</b>	<b>47</b>	<b>0</b>	<b>673</b>	<b>93.1%</b>
<b>San Angelo</b>							
	Coke	82	0	1	0	81	98.8%
	Concho	67	1	1	0	65	97.0%
	Crockett	159	1	2	0	156	98.1%
	Edwards	26	0	1	0	25	96.2%
	Glasscock	28	0	0	0	28	100.0%
	Irion	50	0	2	0	48	96.0%
	Kimble	146	0	9	0	137	93.8%
	Menard	61	0	0	0	61	100.0%
	Reagan	28	0	0	0	28	100.0%
	Real	28	0	6	0	22	78.6%
	Runnels	115	0	11	1	103	89.6%
	Schleicher	28	0	0	0	28	100.0%
	Sterling	52	0	1	0	51	98.1%
	Sutton	90	0	4	0	86	95.6%
	Tom Green	263	0	20	0	243	92.4%
<b>District Total</b>		<b>1223</b>	<b>2</b>	<b>58</b>	<b>1</b>	<b>1162</b>	<b>95.0%</b>
<b>San Antonio</b>							
	Atascosa	151	0	8	0	143	94.7%
	Bandera	56	0	11	0	45	80.4%

Number of Bridges by Condition							
District Name	County	Total Bridges On System	On-System SD	On-System FO	On-System SSLO	Number of On-System Good or Better Bridges	On-System Percent Good or Better
	Bexar	1287	0	187	0	1100	85.5%
	Comal	145	0	11	0	134	92.4%
	Frio	129	0	11	0	118	91.5%
	Guadalupe	239	0	9	0	230	96.2%
	Kendall	80	0	9	0	71	88.8%
	Kerr	142	2	11	0	129	90.9%
	McMullen	53	0	1	0	52	98.1%
	Medina	161	0	9	0	152	94.4%
	Uvalde	94	1	6	0	87	92.6%
	Wilson	97	0	11	0	86	88.7%
<b>District Total</b>		<b>2634</b>	<b>3</b>	<b>284</b>	<b>0</b>	<b>2347</b>	<b>89.1%</b>
<b>Tyler</b>							
	Anderson	111	1	3	0	107	96.4%
	Cherokee	120	0	5	0	115	95.8%
	Gregg	137	1	17	0	119	86.9%
	Henderson	166	0	7	0	159	95.8%
	Rusk	162	0	2	0	160	98.8%
	Smith	249	1	15	1	232	93.2%
	Van Zandt	172	0	14	0	158	91.9%
	Wood	104	1	12	0	91	87.5%
<b>District Total</b>		<b>1221</b>	<b>4</b>	<b>75</b>	<b>1</b>	<b>1141</b>	<b>93.4%</b>
<b>Waco</b>							
	Bell	390	0	44	1	345	88.5%
	Bosque	112	1	4	2	105	93.8%
	Coryell	144	1	7	1	135	93.8%
	Falls	158	2	5	0	151	95.6%
	Hamilton	81	0	3	0	78	96.3%
	Hill	237	1	9	2	225	94.9%
	Limestone	132	0	0	1	131	99.2%
	McLennan	442	0	54	2	386	87.3%
<b>District Total</b>		<b>1696</b>	<b>5</b>	<b>126</b>	<b>9</b>	<b>1556</b>	<b>91.7%</b>
<b>Wichita Falls</b>							
	Archer	96	0	0	0	96	100.0%
	Baylor	51	0	0	0	51	100.0%
	Clay	121	2	11	0	108	89.3%
	Cooke	138	0	10	0	128	92.8%

Number of Bridges by Condition							
District Name	County	Total Bridges On System	On-System SD	On-System FO	On-System SSLO	Number of On-System Good or Better Bridges	On-System Percent Good or Better
	Montague	100	0	3	0	97	97.0%
	Throckmorton	45	1	0	0	44	97.8%
	Wichita	304	2	33	0	269	88.5%
	Wilbarger	118	3	11	2	102	86.4%
	Young	84	0	2	0	82	97.6%
<b>District Total</b>		<b>1057</b>	<b>8</b>	<b>70</b>	<b>2</b>	<b>977</b>	<b>92.4%</b>
<b>Yoakum</b>							
	Austin	110	2	7	0	101	91.8%
	Calhoun	79	2	1	0	76	96.2%
	Colorado	151	1	16	0	134	88.7%
	Dewitt	149	3	7	0	139	93.3%
	Fayette	231	2	13	0	216	93.5%
	Gonzales	232	0	25	0	207	89.2%
	Jackson	126	1	0	0	125	99.2%
	Lavaca	128	0	10	0	118	92.2%
	Matagorda	87	0	4	1	82	94.3%
	Victoria	207	0	8	0	199	96.1%
	Wharton	175	2	10	0	163	93.1%
<b>District Total</b>		<b>1675</b>	<b>13</b>	<b>101</b>	<b>1</b>	<b>1560</b>	<b>93.1%</b>
	<b>Statewide On-System Total</b>	<b>35489</b>	<b>187</b>	<b>3639</b>	<b>80</b>	<b>31583</b>	<b>89.0%</b>

Table B-1.

### Appendix C – Condition of Off-System Bridges by TxDOT District and County as of September 2016

Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off- System SD	Off- System FO	Off- System SSLO	Number of Off- System Good or Better Bridges	Off- System Percent Good or Better
<b>Abilene</b>							
	Borden	3	0	0	0	3	100.00%
	Callahan	19	6	1	1	11	57.89%
	Fisher	73	16	15	9	33	45.21%
	Haskell	13	0	2	0	11	84.62%
	Howard	9	0	1	0	8	88.89%
	Jones	49	1	5	4	39	79.59%
	Kent	8	1	1	4	2	25.00%
	Mitchell	26	2	3	1	20	76.92%
	Nolan	36	1	7	7	21	58.33%
	Scurry	44	2	0	3	39	88.64%
	Shackelford	12	2	1	2	7	58.33%
	Stonewall	15	0	1	3	11	73.33%
	Taylor	85	1	13	4	67	78.82%
<b>District Total</b>		<b>392</b>	<b>32</b>	<b>50</b>	<b>38</b>	<b>272</b>	<b>69.39%</b>
<b>Amarillo</b>							
	Armstrong	1	1	0	0	0	0.00%
	Carson	2	0	2	0	0	0.00%
	Dallam	0	0	0	0	0	N/A
	Deaf Smith	5	0	0	4	1	20.00%
	Gray	21	3	4	1	13	61.90%
	Hansford	10	1	1	1	7	70.00%
	Hartley	0	0	0	0	0	N/A
	Hemphill	4	0	0	0	4	100.00%
	Hutchinson	11	0	0	2	9	81.82%
	Lipscomb	3	0	0	0	3	100.00%
	Moore	2	0	0	2	0	0.00%
	Ochiltree	8	0	0	3	5	62.50%
	Oldham	0	0	0	0	0	N/A
	Potter	22	1	4	0	17	77.27%
	Randall	6	0	1	0	5	83.33%
	Roberts	1	0	0	0	1	100.00%
	Sherman	5	0	0	0	5	100.00%
<b>District Total</b>		<b>101</b>	<b>6</b>	<b>12</b>	<b>13</b>	<b>70</b>	<b>69.31%</b>

Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off-System SD	Off-System FO	Off-System SSLO	Number of Off-System Good or Better Bridges	Off-System Percent Good or Better
<b>Atlanta</b>							
	Bowie	56	1	13	0	42	75.00%
	Camp	4	0	0	0	4	100.00%
	Cass	12	0	1	2	9	75.00%
	Harrison	46	1	5	6	34	73.91%
	Marion	12	0	2	0	10	83.33%
	Morris	21	0	5	6	10	47.62%
	Panola	16	0	10	0	6	37.50%
	Titus	46	3	4	0	39	84.78%
	Upshur	8	0	1	0	7	87.50%
<b>District Total</b>		<b>221</b>	<b>5</b>	<b>41</b>	<b>14</b>	<b>161</b>	<b>72.85%</b>
<b>Austin</b>							
	Bastrop	99	3	18	3	75	75.76%
	Blanco	7	0	2	2	3	42.86%
	Burnet	26	0	2	1	23	88.46%
	Caldwell	47	1	7	3	36	76.60%
	Gillespie	37	2	9	2	24	64.86%
	Hays	57	1	3	0	53	92.98%
	Lee	73	1	23	1	48	65.75%
	Llano	8	0	2	0	6	75.00%
	Mason	11	2	4	4	1	9.09%
	Travis	682	1	117	7	557	81.67%
	Williamson	507	4	48	6	449	88.56%
<b>District Total</b>		<b>1554</b>	<b>15</b>	<b>235</b>	<b>29</b>	<b>1275</b>	<b>82.05%</b>
<b>Beaumont</b>							
	Chambers	16	0	2	3	11	68.75%
	Hardin	47	2	3	3	39	82.98%
	Jasper	44	0	13	0	31	70.45%
	Jefferson	162	1	42	4	115	70.99%
	Liberty	39	1	11	2	25	64.10%
	Newton	41	2	4	7	28	68.29%
	Orange	60	5	18	2	35	58.33%
	Tyler	61	4	7	1	49	80.33%
<b>District Total</b>		<b>470</b>	<b>15</b>	<b>100</b>	<b>22</b>	<b>333</b>	<b>70.85%</b>

Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off-System SD	Off-System FO	Off-System SSLO	Number of Off-System Good or Better Bridges	Off-System Percent Good or Better
<b>Brownwood</b>							
	Brown	95	12	15	13	55	57.89%
	Coleman	42	0	6	7	29	69.05%
	Comanche	99	5	12	12	70	70.71%
	Eastland	62	2	6	7	47	75.81%
	Lampasas	15	0	3	0	12	80.00%
	Mcculloch	25	1	3	2	19	76.00%
	Mills	15	1	1	3	10	66.67%
	San Saba	20	2	2	3	13	65.00%
	Stephens	33	2	8	4	19	57.58%
<b>District Total</b>		<b>406</b>	<b>25</b>	<b>56</b>	<b>51</b>	<b>274</b>	<b>67.49%</b>
<b>Bryan</b>							
	Brazos	146	1	12	2	131	89.73%
	Burleson	48	7	8	8	25	52.08%
	Freestone	52	5	6	3	38	73.08%
	Grimes	97	5	36	6	50	51.55%
	Leon	32	2	5	5	20	62.50%
	Madison	21	4	7	4	6	28.57%
	Milam	55	4	15	3	33	60.00%
	Robertson	43	5	3	4	31	72.09%
	Walker	30	2	2	1	25	83.33%
	Washington	124	2	27	4	91	73.39%
<b>District Total</b>		<b>648</b>	<b>37</b>	<b>121</b>	<b>40</b>	<b>450</b>	<b>69.44%</b>
<b>Childress</b>							
	Briscoe	4	0	0	0	4	100.00%
	Childress	23	1	1	2	19	82.61%
	Collingsworth	19	1	1	1	16	84.21%
	Cottle	25	0	2	0	23	92.00%
	Dickens	12	0	1	0	11	91.67%
	Donley	12	0	0	2	10	83.33%
	Foard	11	2	1	2	6	54.55%
	Hall	29	0	0	1	28	96.55%
	Hardeman	23	1	0	4	18	78.26%
	King	5	0	1	0	4	80.00%

Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off-System SD	Off-System FO	Off-System SSLO	Number of Off-System Good or Better Bridges	Off-System Percent Good or Better
	Knox	7	0	0	0	7	100.00%
	Motley	8	0	1	0	7	87.50%
	Wheeler	18	1	2	4	11	61.11%
<b>District Total</b>		<b>196</b>	<b>6</b>	<b>10</b>	<b>16</b>	<b>164</b>	<b>83.67%</b>
<b>Corpus Christi</b>							
	Aransas	3	0	1	1	1	33.33%
	Bee	22	0	9	1	12	54.55%
	Goliad	43	3	4	2	34	79.07%
	Jim Wells	33	4	3	4	22	66.67%
	Karnes	38	2	6	1	29	76.32%
	Kleberg	2	1	0	0	1	50.00%
	Live Oak	16	6	2	3	5	31.25%
	Nueces	158	4	16	3	135	85.44%
	Refugio	29	2	6	1	20	68.97%
	San Patricio	50	4	5	2	39	78.00%
<b>District Total</b>		<b>394</b>	<b>26</b>	<b>52</b>	<b>18</b>	<b>298</b>	<b>75.63%</b>
<b>Dallas</b>							
	Collin	520	0	116	2	402	77.31%
	Dallas	1354	6	479	16	853	63.00%
	Denton	284	4	53	8	219	77.11%
	Ellis	183	3	62	19	99	54.10%
	Kaufman	51	9	13	2	27	52.94%
	Navarro	94	6	17	12	59	62.77%
	Rockwall	14	0	0	2	12	85.71%
<b>District Total</b>		<b>2500</b>	<b>28</b>	<b>740</b>	<b>61</b>	<b>1671</b>	<b>66.84%</b>
<b>El Paso</b>							
	Brewster	7	0	0	1	6	85.71%
	Culberson	1	0	0	0	1	100.00%
	El Paso	226	3	26	69	128	56.64%
	Hudspeth	1	0	0	0	1	100.00%
	Jeff Davis	0	0	0	0	0	N/A
	Presidio	1	0	1	0	0	0.00%
<b>District Total</b>		<b>236</b>	<b>3</b>	<b>27</b>	<b>70</b>	<b>136</b>	<b>57.63%</b>



Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off-System SD	Off-System FO	Off-System SSLO	Number of Off-System Good or Better Bridges	Off-System Percent Good or Better
<b>Fort Worth</b>							
	Erath	77	2	16	5	54	70.13%
	Hood	23	1	0	1	21	91.30%
	Jack	59	0	11	8	40	67.80%
	Johnson	127	0	16	4	107	84.25%
	Palo Pinto	55	4	6	3	42	76.36%
	Parker	161	3	18	20	120	74.53%
	Somervell	2	0	0	0	2	100.00%
	Tarrant	1037	20	315	15	687	66.25%
	Wise	130	8	19	7	96	73.85%
<b>District Total</b>		<b>1671</b>	<b>38</b>	<b>401</b>	<b>63</b>	<b>1169</b>	<b>69.96%</b>
<b>Houston</b>							
	Brazoria	285	7	36	22	220	77.19%
	Fort Bend	377	8	94	30	245	64.99%
	Galveston	123	4	28	7	84	68.29%
	Harris	1924	18	919	30	957	49.74%
	Montgomery	284	6	35	7	236	83.10%
	Waller	64	3	2	8	51	79.69%
<b>District Total</b>		<b>3057</b>	<b>46</b>	<b>1114</b>	<b>104</b>	<b>1793</b>	<b>58.65%</b>
<b>Laredo</b>							
	Dimmit	2	0	0	0	2	100.00%
	Duval	4	0	0	0	4	100.00%
	Kinney	2	0	0	0	2	100.00%
	La Salle	28	0	8	1	19	67.86%
	Maverick	27	1	2	3	21	77.78%
	Val Verde	12	2	4	0	6	50.00%
	Webb	105	3	30	0	72	68.57%
	Zavala	1	0	0	0	1	100.00%
<b>District Total</b>		<b>181</b>	<b>6</b>	<b>44</b>	<b>4</b>	<b>127</b>	<b>70.17%</b>
<b>Lubbock</b>							
	Bailey	0	0	0	0	0	N/A
	Castro	0	0	0	0	0	N/A
	Cochran	0	0	0	0	0	N/A
	Crosby	4	2	1	0	1	25.00%
	Dawson	0	0	0	0	0	N/A
	Floyd	1	0	0	1	0	0.00%
	Gaines	0	0	0	0	0	N/A
	Garza	1	1	0	0	0	0.00%

Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off-System SD	Off-System FO	Off-System SSLO	Number of Off-System Good or Better Bridges	Off-System Percent Good or Better
	Hale	2	1	1	0	0	0.00%
	Hockley	0	0	0	0	0	N/A
	Lamb	0	0	0	0	0	N/A
	Lubbock	9	1	0	1	7	77.78%
	Lynn	0	0	0	0	0	N/A
	Parmer	5	0	0	0	5	100.00%
	Swisher	4	2	0	1	1	25.00%
	Terry	0	0	0	0	0	N/A
	Yoakum	0	0	0	0	0	N/A
<b>District Total</b>		<b>26</b>	<b>7</b>	<b>2</b>	<b>3</b>	<b>14</b>	<b>53.85%</b>
<b>Lufkin</b>							
	Angelina	58	3	12	3	40	68.97%
	Houston	90	17	25	14	34	37.78%
	Nacogdoches	112	0	27	3	82	73.21%
	Polk	93	32	20	10	31	33.33%
	Sabine	28	0	3	1	24	85.71%
	San Augustine	23	3	1	8	11	47.83%
	San Jacinto	22	0	0	0	22	100.00%
	Shelby	73	14	15	7	37	50.68%
	Trinity	22	0	0	7	15	68.18%
<b>District Total</b>		<b>521</b>	<b>69</b>	<b>103</b>	<b>53</b>	<b>296</b>	<b>56.81%</b>
<b>Odessa</b>							
	Andrews	0	0	0	0	0	N/A
	Crane	0	0	0	0	0	N/A
	Ector	28	0	0	0	28	100.00%
	Loving	0	0	0	0	0	N/A
	Martin	0	0	0	0	0	N/A
	Midland	20	0	3	1	16	80.00%
	Pecos	3	0	0	0	3	100.00%
	Reeves	5	1	1	1	2	40.00%
	Terrell	0	0	0	0	0	N/A
	Upton	0	0	0	0	0	N/A
	Ward	0	0	0	0	0	N/A
	Winkler	0	0	0	0	0	N/A
<b>District Total</b>		<b>56</b>	<b>1</b>	<b>4</b>	<b>2</b>	<b>49</b>	<b>87.50%</b>

Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off-System SD	Off-System FO	Off-System SSLO	Number of Off-System Good or Better Bridges	Off-System Percent Good or Better
<b>Paris</b>							
	Delta	28	4	5	4	15	53.57%
	Fannin	146	20	36	18	72	49.32%
	Franklin	25	1	4	1	19	76.00%
	Grayson	251	7	51	11	182	72.51%
	Hopkins	73	11	13	2	47	64.38%
	Hunt	141	6	7	5	123	87.23%
	Lamar	130	9	23	5	93	71.54%
	Rains	18	0	8	2	8	44.44%
	Red River	48	5	3	4	36	75.00%
<b>District Total</b>		<b>860</b>	<b>63</b>	<b>150</b>	<b>52</b>	<b>595</b>	<b>69.19%</b>
<b>Pharr</b>							
	Brooks	7	2	0	1	4	57.14%
	Cameron	106	3	11	8	84	79.25%
	Hidalgo	169	6	31	12	120	71.01%
	Jim Hogg	0	0	0	0	0	N/A
	Kenedy	0	0	0	0	0	N/A
	Starr	13	0	3	2	8	61.54%
	Willacy	58	1	1	1	55	94.83%
	Zapata	0	0	0	0	0	N/A
<b>District Total</b>		<b>353</b>	<b>12</b>	<b>46</b>	<b>24</b>	<b>271</b>	<b>76.77%</b>
<b>San Angelo</b>							
	Coke	18	0	3	4	11	61.11%
	Concho	5	0	0	1	4	80.00%
	Crockett	0	0	0	0	0	N/A
	Edwards	0	0	0	0	0	N/A
	Glasscock	0	0	0	0	0	N/A
	Irion	0	0	0	0	0	N/A
	Kimble	3	0	2	0	1	33.33%
	Menard	2	0	1	0	1	50.00%
	Reagan	0	0	0	0	0	N/A
	Real	0	0	0	0	0	N/A
	Runnels	44	5	14	11	14	31.82%
	Schleicher	5	0	0	1	4	80.00%
	Sterling	2	1	0	0	1	50.00%
	Sutton	2	0	1	0	1	50.00%
	Tom Green	39	0	6	3	30	76.92%
<b>District Total</b>		<b>120</b>	<b>6</b>	<b>27</b>	<b>20</b>	<b>67</b>	<b>55.83%</b>

Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off-System SD	Off-System FO	Off-System SSLO	Number of Off-System Good or Better Bridges	Off-System Percent Good or Better
<b>San Antonio</b>							
	Atascosa	25	1	0	2	22	88.00%
	Bandera	11	0	4	0	7	63.64%
	Bexar	941	9	192	8	732	77.79%
	Comal	38	0	8	0	30	78.95%
	Frio	17	1	1	0	15	88.24%
	Guadalupe	43	0	7	2	34	79.07%
	Kendall	26	3	4	0	19	73.08%
	Kerr	30	0	12	0	18	60.00%
	McMullen	4	0	0	0	4	100.00%
	Medina	47	3	9	1	34	72.34%
	Uvalde	7	0	0	0	7	100.00%
	Wilson	34	0	11	3	20	58.82%
<b>District Total</b>		<b>1223</b>	<b>17</b>	<b>248</b>	<b>16</b>	<b>942</b>	<b>77.02%</b>
<b>Tyler</b>							
	Anderson	58	6	12	3	37	63.79%
	Cherokee	73	2	25	9	37	50.68%
	Gregg	73	1	10	0	62	84.93%
	Henderson	32	1	10	1	20	62.50%
	Rusk	106	0	10	3	93	87.74%
	Smith	146	7	14	20	105	71.92%
	Van Zandt	75	6	18	7	44	58.67%
	Wood	13	1	2	0	10	76.92%
<b>District Total</b>		<b>576</b>	<b>24</b>	<b>101</b>	<b>43</b>	<b>408</b>	<b>70.83%</b>
<b>Waco</b>							
	Bell	209	5	41	4	159	76.08%
	Bosque	34	5	4	2	23	67.65%
	Coryell	27	3	2	3	19	70.37%
	Falls	157	31	15	15	96	61.15%
	Hamilton	38	5	7	5	21	55.26%
	Hill	147	12	12	17	106	72.11%
	Limestone	150	25	45	14	66	44.00%
	McLennan	250	7	46	18	179	71.60%
<b>District Total</b>		<b>1012</b>	<b>93</b>	<b>172</b>	<b>78</b>	<b>669</b>	<b>66.11%</b>

Number of Bridges by Condition							
District Name	County	Total Bridges Off System	Off-System SD	Off-System FO	Off-System SSLO	Number of Off-System Good or Better Bridges	Off-System Percent Good or Better
<b>Wichita Falls</b>							
	Archer	29	1	2	6	20	68.97%
	Baylor	10	4	0	1	5	50.00%
	Clay	12	1	1	2	8	66.67%
	Cooke	141	2	14	13	112	79.43%
	Montague	130	6	36	7	81	62.31%
	Throckmorton	8	1	0	0	7	87.50%
	Wichita	92	0	20	10	62	67.39%
	Wilbarger	35	1	3	7	24	68.57%
	Young	27	1	3	0	23	85.19%
<b>District Total</b>		<b>484</b>	<b>17</b>	<b>79</b>	<b>46</b>	<b>342</b>	<b>70.66%</b>
<b>Yoakum</b>							
	Austin	101	6	9	2	84	83.17%
	Calhoun	23	3	2	0	18	78.26%
	Colorado	95	4	7	3	81	85.26%
	Dewitt	115	2	17	7	89	77.39%
	Fayette	142	7	59	15	61	42.96%
	Gonzales	56	7	8	2	39	69.64%
	Jackson	44	3	9	1	31	70.45%
	Lavaca	136	5	54	6	71	52.21%
	Matagorda	104	4	5	11	84	80.77%
	Victoria	122	6	28	6	82	67.21%
	Wharton	190	34	10	20	126	66.32%
<b>District Total</b>		<b>1128</b>	<b>81</b>	<b>208</b>	<b>73</b>	<b>766</b>	<b>67.91%</b>
	<b>Statewide Off-System Total</b>	<b>18386</b>	<b>678</b>	<b>4144</b>	<b>952</b>	<b>12612</b>	<b>68.6%</b>

Table C-1.

