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Highway Bridges: Conditions, Funding Programs, and Issues for Congress

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SUMMARY

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Highway Bridges: Conditions, Funding Programs, and Issues for Congress

The United States has approximately 620,000 bridges longer than 20 feet on public roads. About 48% of these bridges are owned by state governments and 50% by local governments. The number of bridges classified as poor has declined gradually for many years, but as of June 2021, about 44,000 remain. The Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58), enacted on November 15, 2021, established federal programs specifically to fund bridges for the first time since FY2012 and significantly increased the total amount of federal funding that can be used for bridge construction and repair.

The act created two large stand-alone bridge programs, the Bridge Formula Program and the Bridge Investment Program, authorized at $27.5 billion and $15.8 billion, respectively, over five years. In addition, the average annual authorizations for the so-called core highway programs that can provide funding for both roads and bridges were increased by roughly 26% over the FY2021 baseline unadjusted for inflation; this money is distributed by formula to the states, which can use it for bridge projects at their discretion. The IIJA also increased funding of existing discretionary surface transportation programs and created several new discretionary programs to which local entities and the states can apply directly to the U.S. Department of Transportation. Bridge projects that match the program criteria are eligible under some of these programs.

Based on an analysis by the Federal Highway Administration of bridge funding needs, the IIJA could conceivably allow state and local governments to spend for five years at a level that would eliminate the national backlog in bridge repair if continued over a 20-year period. The vast majority of bridges in poor condition, over four out of five, are in rural areas. These bridges tend to be small and relatively lightly traveled. In urban areas, bridges in poor condition, while far fewer, are generally much larger and, therefore, more expensive to fix. In 2021, 58% of the deck area classified as in poor condition was on urban bridges. Bridges on roads carrying heavy traffic loads, particularly Interstate Highway bridges, are generally in better condition than those on more lightly traveled routes. Although improvements have been made in most states, there remain major differences among states in the share of bridges in poor condition. For example, about 20% of bridges in West Virginia were classified as poor in 2021, whereas in Nevada the share is 1%. The IIJA reaffirmed congressional support for the improvement of bridges on smaller roads that are not part of the federal-aid system by making these so-called "off-system bridges" eligible under the new bridge programs.

The IIJA replaced the former policy of gradual improvement of the nation's bridges with a more ambitious program to speed up the pace of bridge improvements. The implementation of this policy and its success in improving bridge conditions are likely to be of ongoing concern to Congress. In particular, despite the large increase in nominal funding, it is possible that the IIJA will lead to less bridge repair and replacement than anticipated. Among the potential reasons are the following:

- Rising highway construction costs are eroding the purchasing power of the amounts authorized and appropriated in the IIJA.
- Potential state decisions to use federal highway funds on road projects instead of bridges and state and local fiscal substitution of federal for nonfederal funds could reduce the impact of the increase in bridge spending provided for in the IIJA.
- The large increase in federal grants for bridges under the IIJA could discourage use of tolling as a funding option for state and local governments.

Congress's interest in funding off-system bridges, which are mostly located in rural areas, was affirmed under the IIJA. In addition to continuing the existing off-system bridge spending requirements, the IIJA made off-system bridges eligible under the new bridge programs. The policy could be an issue if it constrains resources available to repair or replace more heavily traveled bridges on major roads.

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Introduction

The United States has approximately 620,000 bridges longer than 20 feet on public roads. The number of bridges classified as poor has declined gradually for many years, but as of June 2021, about 44,000 remain. Most of these bridges are owned and maintained by state and local governments. The federal government has established bridge inspection standards and provides funding to support the rehabilitation and replacement of existing bridges and the construction of new bridges.

The passage of the Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58), covering the years FY2022-FY2026, initiated a major change in congressional bridge funding policy. Prior to passage, federal bridge funding came from programmatic sources that could be spent on either roads or bridges in accordance with priorities set by the states. The IIJA authorized $43.3 billion over five years exclusively for bridge projects; increased authorizations for formula grants that states may choose to use for bridges; and expanded funding for discretionary programs under which bridge projects are eligible.

This report examines current bridge characteristics and conditions, national funding needs, and the implications of the attempt in the IIJA to speed up the pace of bridge improvements. It concludes with a discussion of issues that may be of congressional concern, including the potential impact of inflation on future bridge spending, the future of toll-funded bridges, and spending on bridges not on the federal-aid system.

Bridge Characteristics

Of the 620,000 bridges on public roads, about 48% are owned by state governments, and 50% are owned by local governments. State governments generally own the larger and more heavily traveled bridges, such as those on the Interstate Highway system. Less than 2% of highway bridges are owned by the federal government, primarily those on federally owned land.[1]

About 9% of all bridges carry Interstate Highways, and another 14% serve principal arterial highways other than Interstates.[2] Interstate and other principal arterial bridges carry about 80% of average daily bridge traffic. The highest traffic loads are on Interstate Highway bridges in urban areas; these accounted for only 5% of all bridges but carried 37% of average daily bridge traffic in 2021.[3]

Bridge Inspection

Under the National Bridge Inspection Program, all bridges longer than 20 feet on public roads must be inspected by qualified inspectors, based on federally defined requirements (23 U.S.C. §144). Federal agencies are subject to the same requirements for federally owned bridges, such as those on federal lands. Data from these inspections are reported to the Federal Highway

[1] Federal Highway Administration (FHWA), National Bridge Inventory, "Bridge Condition by Owner, 2021," at https://www.fhwa.dot.gov/bridge/nbi/no10/owner21.cfm.

[2] Arterials, including Interstates, are roads designed to provide for relatively long trips at high speed and usually have multiple lanes and limited access. Principal arterials exclude rural and urban minor arterials. FHWA, National Bridge Inventory, "Bridge Condition by Functional Classification, 2021," at http://www.fhwa.dot.gov/bridge/britab.cfm.

[3] FHWA, National Bridge Inventory, "Bridge Condition by Functional Classification, Average Daily Travel (ADT), 2021," at https://www.fhwa.dot.gov/bridge/nbi/no10/fcadt21.cfm.

Administration (FHWA), which uses them to compile a list of bridges in poor condition. States may use this information to identify which bridges need replacement or repair.[4]

FHWA oversees bridge inspection through the National Bridge Inspection Standards (NBIS).[5] The NBIS set forth how, with what frequency, and by whom bridge inspection is to be completed. The standards provide the following:

- Each state is responsible for the inspection of all public highway bridges within the state except for those owned by the federal government or Indian tribes. Although the state may delegate some bridge inspection responsibilities to smaller units of government, the responsibility for having the inspections done in conformance with federal requirements remains with the state.
- Inspections can be done by anyone qualified under the standards for qualification and training. The inspectors may be state employees, consultants to the states, or others.
- Inspection of a federally owned bridge is the responsibility of the federal agency that owns the bridge.
- In general, a bridge must be inspected at least every 24 months. States are to identify bridges that require less than a 24-month interval. States can also request FHWA approval to inspect certain bridges at intervals as long as 48 months. The interval for an underwater inspection is generally 60 months but may be increased to 72 months with FHWA permission. Nonredundant steel tension members must undergo a hands-on inspection at intervals not to exceed 48 months.[6]
- An on-site inspection team must have a leader who meets additional training requirements. Damage and special inspections do not require the presence of a team leader.
- Load rating of a bridge must be under the responsibility of a registered professional engineer. Structures that cannot carry maximum legal loads for the roadway must be posted.

The vast majority of inspections are performed under state authority. FHWA bridge engineers, at times, perform field reviews to assure that states are complying with the bridge inspection requirements. FHWA also provides on-site engineering expertise in the examination of the causes of catastrophic bridge failures.

Bridge Conditions

Bridge condition data reported to FHWA are collected in the National Bridge Inventory. This information permits FHWA to characterize the existing condition of bridges as good, fair, or poor. A bridge is considered in good condition if the deck, superstructure, and substructure are rated at least 7 on a 0-9 scale. If any of these bridge elements is rated 5 or 6, a bridge is considered in fair condition. A bridge is considered in poor condition if any element is rated 4 or less. A bridge

[4] The National Bridge Inspection Program was initiated in 1968 following the 1967 collapse of the so-called Silver Bridge over the Ohio River. The National Bridge Inspection Standards were first issued in 1971. See FHWA, "Tables of Frequently Requested NBI Information," at http://www.fhwa.dot.gov/bridge/britab.cfm.

[5] 23 C.F.R. §650, subpart C.

[6] A nonredundant steel tension member is a primary steel member in tension, or with a tension element, whose failure would probably cause a portion of or the entire bridge to collapse. A nonredundant steel tension member was previously known in regulation as a fracture critical member.

classified as poor is not necessarily unsafe but may require the posting of a vehicle weight restriction. When officials determine that a bridge is unsafe, it is closed to traffic. In 2021, about 3,500 (0.5%) bridges were closed and another 62,000 (10%) had a weight restriction.

In 2021, 278,000 public road bridges (45%) were considered good, 298,000 (48%) fair, and 44,000 (7%) poor. The number of poor bridges declined by about 13,000 over the 10-year period from 2012 to 2021, whereas the number of bridges in good condition dropped by 9,000, and the number of bridges in fair condition increased by 35,000 (**Table 1**).

Table 1. Bridge Condition Ratings, 2012 and 2021

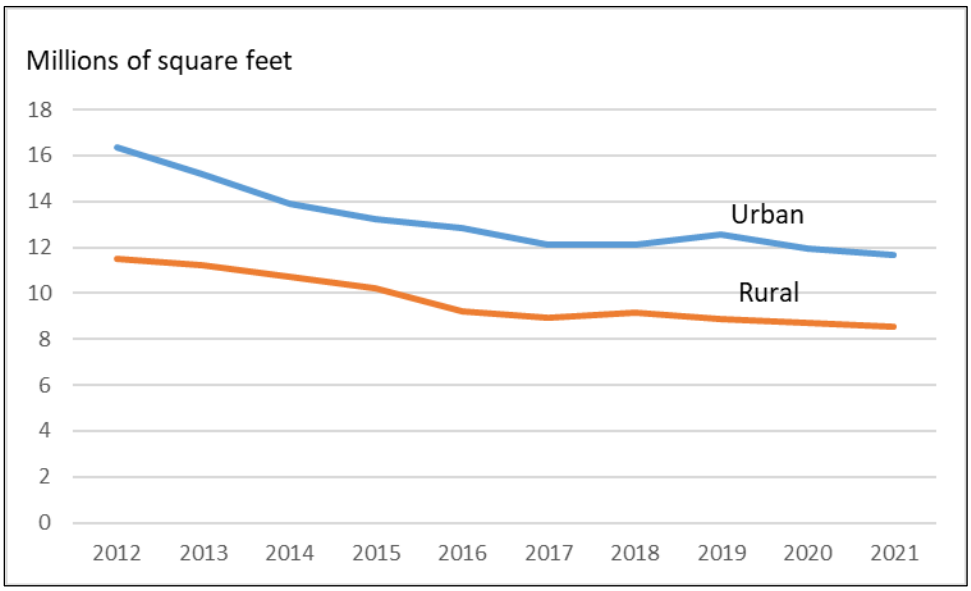
	2012		2021	
Rating	**Number**	**Percentage**	**Number**	**Percentage**
Good	287,194	47.3	278,128	44.9
Fair	262,878	43.3	297,908	48.1
Poor	57,049	9.4	43,586	7.0
Total	607,121	100.0	619,622	100.0

Source: Bureau of Transportation Statistics, *National Transportation Statistics*, Table 1-28, at https://www.bts.gov/content/condition-us-highway-bridges.

Notes: Data for 2012 are as of December 31. Data for 2021 are as of June 15.

About 80% of the bridges in poor condition in 2021 were located in rural areas. Nevertheless, urban bridges in poor condition are generally much larger and carry more traffic than those in rural areas and, therefore, are more expensive to fix. In 2021, 58% of the total deck area of bridges in poor condition was in urban areas. The amount of deck area in poor condition has dropped by about the same proportion in urban and rural areas from 2012 through 2021, nearly 30%.

Figure 1. Urban and Rural Highway Bridges in Poor Condition, 2012-2021



Source: Bureau of Transportation Statistics, *National Transportation Statistics*, Table 1-28, at https://www.bts.gov/content/condition-us-highway-bridges.

Notes: Data for 2012-2020 are as of December 31. Data for 2021 are as of June 15.

Bridges on Interstate Highways are generally in better condition than those on more lightly traveled routes: 3% of urban Interstate Highway bridges were considered poor in 2021, whereas 7% of urban bridges on local roads were classified as poor.[7] Likewise, 3% of rural Interstate Highway bridges were poor in 2019, compared with 11% of rural bridges on local roads. In 2021, 9% of bridges owned by local governments were classified as poor, compared with 5% of state-owned bridges. For bridge condition ratings by state and territory, see **Table A-1**.

Bridge Infrastructure Funding

Federal and State Roles

Federal bridge funding shares the basic attributes of federal aid to highways, which is administered by FHWA.[8] Most of this funding is apportioned by formula to the states from the Highway Trust Fund and is not subject to annual appropriation by Congress. Each state's funds are divided among 10 so-called core formula programs established by law. State departments of transportation (state DOTs) are free to spend the funds allocated to each program in any way consistent with that program's purposes, so long as they comply with detailed federal planning guidelines and performance management measures.[9] State DOTs execute the contracts and oversee the construction process. The decision about how much of a state's formula funding to spend on bridges rather than roads is generally up to the state DOT.[10] States are allowed to transfer ("flex") up to 50% of each core formula program's apportioned funds to other formula programs.[11] Most bridge projects receive a federal cost share of up to 80%, but for bridges on Interstate Highways, the share is generally up to 90%. The use of federal funds for bridges, unlike most road funding, is not restricted to designated federal-aid highways and may be used on any bridge listed in the National Bridge Inventory.

In addition, states or municipalities may seek discretionary (competitive) grants awarded by FHWA or the Office of the Secretary of Transportation. For example, the Nationally Significant

[7] Interstates are the highest class of roadways in FHWA's functional classification system, and local roads are the lowest.

[8] CRS Report R47022, *Federal Highway Programs: In Brief*, by Robert S. Kirk.

[9] FHWA's Final Rule for National Performance Management Measures: Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program became effective on February 17, 2017. See 82 *Federal Register* 5886, at https://www.federalregister.gov/documents/2017/01/18/2017-00550/national-performance-management-measures-assessing-pavement-condition-for-the-national-highway.

[10] The main exception under the core formula programs is that under the Surface Transportation Block Grant Program (STBG), an amount equal to 15% of a state's FY2009 Highway Bridge Program apportionment must be set aside from certain population-based set-asides for spending on off-system bridges. Another of the programs, the National Highway Performance Program, requires that, if in the preceding three years more than 10% of the total deck area of bridges in the state on the National Highway System (NHS) is located on bridges classified in poor condition, the state must set aside an amount equal to 50% of the state's FY2009 Highway Bridge Program apportionment for eligible projects on bridges on the NHS. The penalty remains in effect until the NHS deck area on bridges in poor condition is brought below 10% of the total NHS deck area in the state.

[11] Metropolitan Planning Program funds and suballocated funds under the STBG are among those shielded from transfer. See FHWA, "Transferability of Apportioned Program Funding under 23 U.S.C. 126," at https://www.fhwa.dot.gov/cfo/23usc126_transferability.cfm.

Freight and Highway Projects Program (renamed INFRA) also may award funding for large bridge projects.[12]

Congress and Bridge Policy

For the first 53 years of federal aid to highways, federal policy left decisions about allocating money to bridge projects to the states. There was no federal program funding dedicated to bridges. This changed following the collapse of the so-called Silver Bridge over the Ohio River in December 1967, which resulted in the deaths of 46 people. Congress required the Secretary of Transportation to establish the NBIS in 1968. In February 1970, FHWA reported that of the 563,000 bridges in the United States, 88,900 were "critically deficient." Despite the findings, the agency recommended against funding a "special bridge program" on the grounds that such a program would "necessarily be at the expense of other urgent highway needs."[13]

Contrary to this recommendation, the Federal-Aid Highway Act of 1970 (P.L. 95-599) authorized the discretionary Special Bridge Replacement Program, the first stand-alone federal highway bridge funding program. Having a stand-alone program was a way for Congress to dedicate certain funding to bridges rather than roads. The Surface Transportation Assistance Act of 1978 (P.L. 95-599) replaced this with a new formula-based Highway Bridge Replacement and Rehabilitation Program, which expanded eligibilities to include bridge rehabilitation and projects on off-system bridges. Roughly 20% of the program's funding was set aside for a bridge discretionary program for large bridge projects. These discretionary funds were under the control of FHWA.

The 1991 Intermodal Surface Transportation Efficiency Act (P.L. 102-240) allowed a state to transfer 40% of its bridge apportionment to other highway programs (the percentage was increased to 50% in 1998). The Moving Ahead for Progress in the 21st Century Act (MAP-21; P.L. 112-141), enacted in 2012, allowed the dedicated bridge program—then called the Highway Bridge Program—to expire at the end of FY2012, largely returning the decision to the states on how much of their federal formula grants to spend on bridges. This situation persisted until Congress passed the IIJA, which reasserted bridge spending as a congressional priority.

Recent Spending History, FY2015-FY2021

Under the Fixing America's Surface Transportation Act (FAST Act; P.L. 114-94), as amended through FY2021, bridge projects were funded from highway programs that states or grantees could also use to fund road projects. States also had access to residual funds from the expired Highway Bridge Program. **Table 2** shows the total obligation of federal funding for bridges, including funds from the former Highway Bridge Program and those from all other programmatic sources, from FY2015 through FY2021. The table also expresses obligations in constant FY2015 dollars to show the impact of inflation.

[12] INFRA awards are administered by the Office of the Secretary of Transportation, not by FHWA.

[13] U.S. Congress, House Committee on Public Works, *1970 National Highway Needs Report*, committee print, 91st Cong., 2nd sess., February 1970, H.Prt. 91-27 (Washington, DC: GPO, 1970), pp. 30-32. The report estimated that there were 24,000 deficient bridges on the federal-aid system and 64,900 deficient bridges off the federal-aid system.

Table 2. Trends in Federal Bridge Obligations, FY2015-FY2021

(current and inflation-adjusted dollars in millions)

	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021
Total (Current $)	$6,804	$7,095	$6,666	$7,092	$7,365	$7,797	$8,569
% Change from Previous Year		+4%	-6%	+6%	+4%	+6	+10
Highway Bridge Program (pre-FY2013 Program)	$243	$80	$72	$44	$2	$56	-$38
Surface Transportation Block Grant Program	$604	$587	$558	$1,662	$2,212	$2,317	$2,173
National Highway Performance Program	$3,638	$3,910	$3,937	$3,790	$4,033	$4,171	$3,998
All Other Programs	$2,319	$2,518	$2,099	$1,596	$1,118	$1,253	$2,436
Total (Inflation-Adjusted, 2015$)	$6,804	$7,078	$6,492	$6,613	$6,682	$7,003	$7,379[a]
% Change from Previous Year		+4%	-8%	+2%	+1%	+5	+5%

Sources: Federal Highway Administration (FHWA). Cost adjustments for FY2016-FY2020 calculated by CRS using Bureau of Economic Analysis, *Price Indexes for Gross Government Fixed Investment by Type*, National Income and Product Accounts Table 5.9.4, Line 40: State and local highways and streets. Weighted average used to approximate fiscal years.

Notes: For a detailed table of bridge obligations for these years, see **Table A-2**. Totals reflect ongoing obligations of funds under prior authorizations. Totals may not add due to rounding. Highway Bridge Program funding for FY2015-FY2021 reflects funds unobligated when the program was discontinued at the end of FY2012. Surface Transportation Block Grant Program includes both Surface Transportation Program and Surface Transportation Block Grant Program funds. Annual appropriations from FY2018 to FY2020 are included in All Other Programs.

a. FY2021 cost adjustment based on FHWA, *National Highway Construction Cost Index*, adjusted to fiscal year average.

During FY2021, obligations for spending on bridges were approximately 26% higher than in FY2015. When adjusted for inflation in road construction costs, however, the increase was about 8% during these years.

Additional Appropriated Funds

Beginning in FY2018, Congress has appropriated funding for bridges outside the authorization process. The Consolidated Appropriations Act, 2018 (P.L. 115-141) included $225 million for a competitive bridge program for states with a population density of 100 per square mile or less. The Consolidated Appropriations Act, 2019 (P.L. 116-6) provided $475 million for a Bridge Replacement and Rehabilitation Program, to be distributed by formula to states for which the percentage of total bridge deck area classified as poor was at least 7.5%. The Further Consolidated Appropriations Act, 2020 (P.L. 116-94) provided $1.15 billion but broadened the eligibility to states for which the percentage of total bridge deck area classified as poor is at least 5%. The Consolidated Appropriations Act, 2021 (P.L. 116-260) provided $1.08 billion for this program. For these years, Congress in effect pursued a two-pronged approach by making bridges eligible for funding at state discretion under the large highway formula programs established in authorization acts and supplementing these funds with targeted bridge funding in annual appropriations acts.

Bridge Funding and Policy Changes in the IIJA

The IIJA both reauthorized spending authority from the Highway Trust Fund for highway programs at an increased level and provided an additional boost to infrastructure spending via multiyear supplemental appropriations from the Treasury general fund. Some programs are authorized to receive additional funding subject to appropriation in future annual appropriations acts.

New Bridge Programs

The IIJA created two stand-alone programs dedicated to bridge projects:

- The Bridge Replacement, Rehabilitation, Preservation, Protection, and Construction Program, generally referred to as the Bridge Formula Program (BFP), is to distribute $5.5 billion annually to the states through FY2026.
- The Bridge Investment Program (BIP) is authorized to distribute nearly $16 billion in competitive grants through FY2026, although $3.265 billion of that amount is subject to future appropriations (see **Table 3**).

If the states continue to spend on bridges from their ongoing federal programs at the FY2021 level, these new IIJA programs would roughly double average annual spending (unadjusted for inflation) on highway bridges. Adjusting these amounts for expected inflation using the Congressional Budget Office (CBO) gross domestic product (GDP) price index for FY2017-FY2032 indicates a substantial loss of purchasing power over the life of the IIJA. However, most of the increase in new federal bridge spending remains.

Table 3. New Highway Bridge Programs: IIJA Funding

(millions of nominal dollars unless indicated)

Program	FY2022	FY2023	FY2024	FY2025	FY2026	Annual Average (FY2022-FY2026)	Program Total (FY2022-FY2026)
Total	$8,547	$8,627	$8,647	$8,697	$8,747	$8,653	$43,265
BFP (Assured)	$5,500	$5,500	$5,500	$5,500	$5,500	$5,500	$27,500
BIP (Total)	$3,047	$3,127	$3,147	$3,197	$3,247	$3,153	$15,765
BIP (Assured)	$2,447	$2,487	$2,497	$2,522	$2,547	$2,500	$12,500
BIP (STA)	$600	$640	$650	$675	$700	$653	$3,265
Projected Total FY2021 $[a]	$8,086	$7,915	$7,762	$7,656	$7,541	$7,792	$38,960
Projected Cumulative % Loss of Purchasing Power Since start of FY2022[a]	-5%	-8%	-10%	-12%	-14%	-10%	-10%

Source: FHWA. Projected inflation-adjusted totals reflect the projected value at the end of the year of initial availability. Most funds are available for obligation for four years. According to FHWA, 84% of obligated funds, on average, are outlayed in the first three years after obligation.

Notes: BFP = Bridge Formula Program; BIP = Bridge Investment Program; STA = authorized funds subject to future appropriations. *Assured* funding refers to multiyear appropriations and Highway Trust Fund (HTF) funded authorizations, which may be obligated without further appropriations action. HTF funds may be subject to changes to limitations on obligations.

a. Inflation projections based on Congressional Budget Office (CBO), GDP Price Index FY2017-FY2032, in CBO, *The Budget and Economic Outlook: 2022 to 2032*. Calculated and adjusted to FY2021=100 by CRS.

Bridge Formula Program

BFP funds are distributed to states (including the District of Columbia and Puerto Rico) based on each state's cost to replace its poor-condition bridges and to rehabilitate its fair-condition bridges, relative to the total nationwide cost.[14] The IIJA funds the program with $5.5 billion annually over the life of the act. The minimum amount a state will receive is $45 million annually. At least 15% of each state's funds must be spent on bridges not on the federal-aid system, so-called "off-system bridges," and $165 million (3%) is set aside annually for bridges on tribal lands.[15] Off-system bridges, owned by sub-state government entities or federally recognized tribes, are eligible for 100% federal share. State DOTs choose the projects, other than for tribal lands bridges. The funds may be used for highway bridge replacement, rehabilitation, preservation, protection, or construction projects on any bridge listed in the National Bridge Inventory or any new highway bridge that upon completion would be included in the inventory. BFP funds may not be transferred to other programs. This formula program is entirely funded with multiyear appropriations from the general fund.

Bridge Investment Program

The BIP provides competitive grants for bridge replacement, rehabilitation, preservation, or resiliency improvements for bridges on the National Bridge Inventory.[16] The IIJA authorizes an average annual $3.153 billion for the program, of which roughly one-fifth is subject to annual appropriations. A state or group of states, sub-state governmental entities or groups of such entities, special purpose districts or public authorities that serve a transportation function, metropolitan planning organizations that serve populations over 200,000, federal land management agencies, tribal governments, or any combination of the aforementioned entities may apply directly to the U.S. Department of Transportation.[17] BIP grants can be used to replace, rehabilitate, preserve, or protect (including adding resilience features) bridges or to replace or rehabilitate culverts to improve flood control and habitat connectivity for aquatic species. A grantee may also use BIP funding to pay subsidy costs of a federal loan under the Transportation Infrastructure Finance and Innovation Act (TIFIA).

The program creates three categories of projects for which eligible entities may apply:

- $20 million is set aside annually for planning, feasibility analysis, and revenue forecasting grants. There is no minimum size for planning grants.
- Large Bridge Project grants are available for projects with total eligible costs of greater than $100 million. The maximum award may not exceed 50% of the total eligible project cost, making the minimum award amount $50 million. The award may be split into a multiyear award over four consecutive fiscal years.

[14] FHWA, Revised Apportionment of Fiscal Year (FY) 2022 Highway Infrastructure Program Funds for the Bridge Formula Program Pursuant to the Infrastructure Investment and Jobs Act, Notice N 4510.867, April 8, 2022, at https://www.fhwa.dot.gov/legsregs/directives/notices/n4510867.cfm.

[15] 23 U.S.C. §202(d).

[16] FHWA, "Bridge Investment Program," at https://www.fhwa.dot.gov/bridge/bip/, updated July 18, 2022.

[17] FHWA, "View Grant Opportunity: Bridge Investment Program," June 10, 2022, at https://www.grants.gov/view-opportunity.html?dpp=1&oppId=341050.

- Bridge Project grants are available for projects with total eligible costs of $100 million or less. The maximum award may not exceed 80% of the total eligible project cost, and the minimum award is $2.5 million.

The IIJA allows up to 5% of BIP funding to be used for eligible projects that consist solely of culvert replacement or rehabilitation of bridge-sized culverts (as defined under 23 C.F.R. §650.305) for flood control or to improve habitat connectivity for aquatic species.

Other sources of federal assistance may be used to satisfy the nonfederal share as long as the total federal share does not exceed the amount allowable under 23 U.S.C. §120 or 23 U.S.C. §124 for off-system bridges. For a federal land management agency, tribal government, or a consortium of tribal governments, federal funds made available under non-BIP federal programs (including Tribal Transportation Program and Federal Lands Transportation Program funds) may be used to pay the remaining cost of a BIP project.

Federal Lands and Tribal Bridges

Most funding for highways and bridges owned by the federal government or by Indian tribes does not come from the regularly apportioned programs discussed above. Funding is authorized separately, primarily from two stand-alone programs: the Tribal Transportation Program and the Federal Lands Transportation Program.[18] The Tribal Transportation Program funds are under the control of the tribes, in cooperation with the Department of the Interior and the Department of Transportation. The Federal Lands Transportation Program funds are under the control of the federal land management agencies, with assistance and oversight from the Department of Transportation. A third program, the Federal Lands Access Program, funds facilities that provide access to federal lands. The use of these funds in each state is determined by a state committee that includes representatives of FHWA, the state DOT, and a political subdivision of the state.

Compared with the core highway formula programs, these programs are small. The IIJA provides $602 million annually for the Tribal Transportation Program and $439 million annually for the Federal Lands Transportation Program. The Federal Lands funding amount is divided among the National Park Service ($346 million), the Fish and Wildlife Service ($36 million), the U.S. Forest Service ($26 million), and other federal land management agencies ($31 million). The IIJA provides $298 million annually for the Federal Lands Access Program. These three programs' funds must cover road and bridge needs, and the funds may be used on public transportation projects. These programs are paid for from the Highway Trust Fund.

The IIJA also provides $205 million per year specifically for tribal bridges with funding set aside from the larger bridge programs, a sizable increase for tribal bridges annually under prior law, and $55 million annually under the National Significant Federal Lands and Tribal Projects Program. The IIJA created several new discretionary highway and bridge grant programs for which tribal projects are eligible.

Other Program Sources of Bridge Funding[19]

Broad sources of highway funding for states to improve their bridges existed prior to the IIJA and have been continued at increased funding levels. In particular, three of these formula programs—the Surface Transportation Block Grant Program, the National Highway Performance Program,

[18] CRS In Focus IF12129, *Tribal Highway and Public Transportation Programs*, by William J. Mallett.

[19] CRS Report R47022, *Federal Highway Programs: In Brief*, by Robert S. Kirk (see tables 1 and 2 for a complete listing of IIJA highway programs).

and the National Highway Freight Program—together have been the major sources of bridge funding since FY2013 and continue to be available for bridge projects. Funding from other legacy formula programs, such as Transportation Alternatives and the Congestion Mitigation and Air Quality Improvement Program, also can be used, depending on the specifics of the project. According to FHWA data, in FY2021, $8.6 billion was obligated for bridge projects from all federal highway program sources (see **Table 2**). Competitive grant program grants (e.g., from INFRA) and the Local and Regional Project Assistance Program (also referred to as RAISE grants) continue to be available for bridge projects. Appalachian Development Highway System appropriations provided in the IIJA and annual appropriations bills may be used for bridge projects on that system.

FHWA's Emergency Relief Program

The Emergency Relief Program provides funding for bridges damaged in natural disasters or that are subject to catastrophic failures from an outside source.[20] The program provides funds for emergency repairs to restore essential travel immediately after the failure to restore essential traffic, as well as for longer-term permanent repairs.

The IIJA changed the time frame within which the federal government will pay 100% of the cost of emergency repairs from 180 days to 270 days from the date of the disaster. Later repairs, as well as permanent repairs, such as reconstruction or replacement of a collapsed bridge, are reimbursed at the same federal share that would normally apply to the federal-aid highway facility. The IIJA strengthens the language permitting the funding of added protective features to include features that are economically justifiable improvements that will mitigate the risk of recurring damage from extreme weather, flooding, and other natural disasters. The act also adds a list of eligible protective features under the program.

New Non-bridge Programs That Can Assist Bridge Projects

The IIJA created new formula and competitive grant programs that, while not stand-alone bridge programs, can provide funding for bridge projects, depending on the specifics of the project. Among these programs are the following:

- **Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT)** funds can be used for bridge-related infrastructure resilience spending. The IIJA funds this new core formula program at an annual average of $1.46 billion. The act also created a PROTECT competitive grant program funded at an annual average of $300 million.
- **Rural Surface Transportation Grant Program** is funded at an annual average of $400 million.
- **Nationally Significant Projects Program** (also referred to as MEGA) is a multimodal program designed to fund large, complex transportation infrastructure projects, including highway bridges. The program is funded at $1 billion annually from multiyear appropriations and authorized to receive an additional $2 billion annually, subject to appropriation. The program is administered by the Office of the Secretary of Transportation.
- **National Culvert Removal, Replacement, and Restoration Grant Program** is a multimodal program to be administered by the Office of the Secretary that

[20] CRS Report R45298, *Emergency Relief for Disaster-Damaged Roads and Public Transportation Systems*, by Robert S. Kirk and William J. Mallett.

funds projects that improve or restore passage of anadromous fish (such as salmon). The program is funded at an annual average of $200 million in multiyear appropriations and authorized at $800 million annually, subject to appropriations.

Future Bridge Funding Needs

Every two years or so, FHWA assesses the condition and performance of the nation's highways and bridges, documents current spending by all levels of government, and estimates future spending needs to maintain or improve current conditions and performance.[21] As with any attempt to forecast future conditions, a host of simplifying assumptions, omissions, and data problems influence these estimates. Among other things, the estimates rely on forecasts of travel demand. Despite such uncertainties and assumptions, these estimates provide a way to assess the level of current spending compared with what would be needed in the future under different scenarios. Because of the modeling involved, FHWA's future needs estimates for bridges are limited to fixing deficiencies in existing bridges only when the benefits outweigh the costs.

The most recent assessment was published in 2021 based on 2016 data. Represented in 2021 dollars, this assessment showed that $17.2 billion was spent on bridge rehabilitation or replacement by governments at all levels in 2016. An additional $1.9 billion was spent on the construction of new bridges.[22] It estimated that fixing all bridge deficiencies existing in 2016 would cost $148 billion (in 2021 dollars). This figure is almost nine times the level of spending on bridge rehabilitation and replacement in 2016.[23]

Of course, fixing all deficient bridges overnight is not feasible. FHWA, therefore, estimated how this investment backlog may change at various levels of spending during 2017-2036, taking into account the deterioration of existing bridges over that period. The results of this analysis are seen in **Figure 2**. FHWA estimated that eliminating the backlog by 2036 would require an investment of $28.1 billion annually (in 2021 dollars).

The IIJA provided an increase in federal highway funding overall and created new dedicated bridge funding programs that provide an annual average of $7.8 billion (in 2021 dollars) (**Table 3**). If states decide to commit the same amount of their general federal highway funding to bridges as they did in FY2021, about $8.6 billion, total federal funding committed to bridges would be about $16.4 billion annually. Assuming that state and local funds continue to provide 53% of all bridge spending, as has been the case in recent years, total bridge spending could amount to around $34.8 billion per year (in 2021 dollars) under the IIJA.[24]

This bridge spending estimate does not take into account the increase in funding for general highway programs in the IIJA or the improved opportunity for accessing competitive grant programs for bridge projects. Even so, the funding amounts in the IIJA could conceivably allow for total spending for five years at the level FHWA estimates would be needed to eliminate bridge

[21] The "maintain" scenario assumes that capital investment changes so that selected measures of bridge performance in 2036 are maintained at their 2016 levels. The "improve" scenario is the level of spending in which the investment is made in all projects by 2036 for which the economic benefits are equal to or greater than the economic costs.

[22] U.S. Department of Transportation, FHWA, and Federal Transit Administration, *Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report to Congress*, 24th ed., pp. 2-17, October 2021, at https://doi.org/10.21949/1521794.

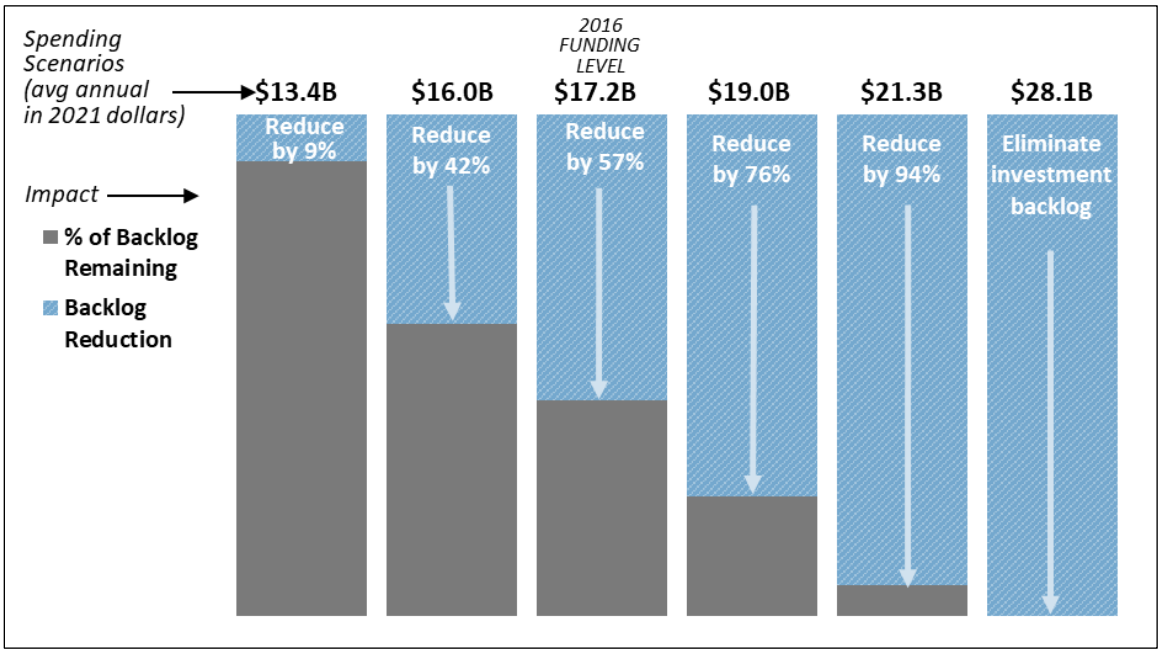
[23] Ibid., exhibit 10-15.

[24] The historical estimate of the state and local share of highway capital outlays is taken from Congressional Budget Office, *Public Spending on Transportation and Water Infrastructure, 1956 to 2017*, supplemental tables 1, 2, and 6, at https://www.cbo.gov/publication/54539.

deficiencies if continued over 20 years (i.e., $28.1 billion per year), and have $6.7 billion per year available for the construction of new bridges. However, as state and local governments make most of the decisions concerning which projects to pursue and, within the limits of federal matching share requirements, how much of their own money to commit, it is uncertain whether total bridge spending will achieve this level.

Figure 2. Estimated Effect of Various Spending Levels on Bridge Investment Backlog

(Average annual spending for 20 years)



Source: U.S. Department of Transportation, FHWA, and Federal Transit Administration, *Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance Report to Congress*, 24th ed., October 2021, exhibit 10-15.

Notes: The current funding level is for 2016, and the 20-year spending scenarios are for 2017 through 2036. CRS adjusted the data expressed in 2016 dollars to 2021 dollars using the implicit GDP deflator.

Issues for Congress

The IIJA replaced the former policy of gradual improvement of the nation's bridges with a more ambitious program to speed up the pace of bridge improvements. The implementation of this policy and its success in improving bridge conditions are likely to be of ongoing concern to Congress.

Loss of Purchasing Power

Because inflation was low for many years, it was not an issue during the reauthorization debate that preceded passage of the IIJA. However, more rapid price rises since early 2020 have raised the prospect that inflation may erode the value of the increased bridge spending provided in the

IIJA. Inflation projections by CBO suggest that the funds authorized and appropriated in the IIJA could lose 10% of their purchasing power over the period FY2022-FY2026. [25]

The loss of purchasing power could be greater than this, given that indexes of highway construction costs have risen faster over the last five years than the measure used by CBO.[26]

Another factor that could make the impact of inflation more severe is the way funding for highways is distributed and managed. Each year's federal highway funds are made available for obligation for four years. Obligation occurs when the state or grantee signs a project agreement with FHWA in which FHWA commits to the federal portion of the project cost. According to FHWA, 84% of funds are spent within three years of obligation, but some funds take as long as nine years to expend.[27] The time involved in expending authorized funds could make the loss in purchasing power greater than indicated in **Table 3**.

Programmatic Substitution

Given the large increase in bridge spending from bridge-only programs, states may choose to rely mainly on BFP and BIP to fund bridge projects and use a greater share of their core formula funds on non-bridge highway projects. This could result in the net increase in spending on bridges being less than Congress may have assumed in enacting the IIJA.

Maintenance of Effort

Research by CBO has estimated that state and local governments that receive federal grants for highway projects "reduce their own per capita spending on highway capital by 26 cents for an additional dollar of annual federal formula grants."[28] This raises the possibility that the IIJA will lead to less combined state and federal spending on highway bridges than previous state and local spending patterns imply.

Tolling of Non-tolled Bridges

Wider use of tolling could allow for more rapid improvement of major bridges. Heavily traveled bridges can be attractive targets for conversion to toll facilities—many bridges have no convenient alternatives, so drivers may find it difficult to avoid paying whatever toll is imposed. The revenue stream provided by tolls can make bridge building and reconstruction an attractive investment for private entities that are interested in participating in a public-private partnership. Tolling can also help projects become eligible for a TIFIA loan that requires a dedicated revenue stream for repayment.[29] Currently, any toll-free federal-aid highway bridge may be converted to

[25] CBO, *Budget and Economic Outlook: 2022-2032*, June 2022, at https://www.cbo.gov/data/budget-economic-data#7.

[26] For FY2017-FY2020, the U.S. Bureau of Economic Analysis Highways and Streets index rose an average of 4.25% more than CBO gross domestic product (GDP) projections. For FY2017-FY2021, the National Highway Construction Cost Index exceeded the CBO GDP index by an average of 2.4% per year.

[27] FHWA, *Funding Federal Aid Highways*, "Outlay of Funding," January 2017, at https://www.fhwa.dot.gov/policy/olsp/fundingfederalaid/06.cfm.

[28] Sheila Campbell and Chad Shirley, *Fiscal Substitution in Spending for Highway Infrastructure*, CBO, Working Paper 2021-13, October 2021, pp. 1-45, at https://www.cbo.gov/publication/57430. The report notes that their finding is at the lower end of estimates in existing literature.

[29] CRS Report R44910, *Tolling U.S. Highways and Bridges*, by Robert S. Kirk.

tolling and receive federal highway aid if the conversion is related to the reconstruction or replacement of the bridge. Also, new bridges may be tolled.[30]

The large increase in IIJA bridge funding could on the one hand lessen the use of tolling as a financing option, given that bridge tolls are often unpopular. On the other hand, the IIJA provides $50 million annually to the Congestion Relief Program for congestion solutions, including the imposition of tolls for congestion pricing. Congress may want to explore whether the IIJA has affected the use of tolls to fund construction or reconstruction of bridges.

Spending on Off-System Bridges

Historically, nearly all federal highway funding was restricted to roads and bridges on the federal-aid highway system. Highway bridges have been the main exception to the rule. A minimum level of spending on off-system bridges, which typically carry much less traffic than bridges on the federal-aid system, has been required in every highway authorization bill since 1978.

Congress's interest in funding off-system bridges was affirmed under the IIJA. The existing off-system bridge spending requirements were continued and the set-aside for off-system projects has been strongly supported by predominantly rural states and by many county and municipal governments. The policy could be an issue if it constrains resources available to repair or replace more heavily traveled bridges on major roads.

[30] The exception to the reconstruction or replacement requirement would be to convert all or some of the bridge lanes to a congestion pricing facility under the Value Pricing Pilot Program.

Appendix.

Table A-1. Bridge Condition by State and Territory

(data as of June 15, 2021)

State	All Bridges (number)	Condition Rating (number)			Condition Rating (percentage)		
		Good	Fair	Poor	Good	Fair	Poor
Alabama	16,164	6,550	9,028	586	40.5	55.9	3.6
Alaska	1,632	716	782	134	43.9	47.9	8.2
Arizona	8,467	5,275	3,075	117	62.3	36.3	1.4
Arkansas	12,941	6,234	6,028	679	48.2	46.6	5.2
California	25,737	12,224	12,020	1,493	47.5	46.7	5.8
Colorado	8,869	3,063	5,337	469	34.5	60.2	5.3
Connecticut	4,361	1,249	2,881	231	28.6	66.1	5.3
Delaware	875	291	567	17	33.3	64.8	1.9
Dist. of Columbia	246	74	165	7	30.1	67.1	2.8
Florida	12,680	8,052	4,169	459	63.5	32.9	3.6
Georgia	14,987	11,054	3,614	319	73.8	24.1	2.1
Hawaii	1,162	265	810	87	22.8	69.7	7.5
Idaho	4,561	1,322	3,001	238	29.0	65.8	5.2
Illinois	26,846	12,848	11,593	2,405	47.9	43.2	9.0
Indiana	19,337	7,866	10,389	1,082	40.7	53.7	5.6
Iowa	23,870	9,354	10,012	4,504	39.2	41.9	18.9
Kansas	24,925	13,335	10,313	1,277	53.5	41.4	5.1
Kentucky	14,410	4,089	9,331	990	28.4	64.8	6.9
Louisiana	12,782	5,931	5,220	1,631	46.4	40.8	12.8
Maine	2,485	728	1,443	314	29.3	58.1	12.6
Maryland	5,446	1,789	3,404	253	32.8	62.5	4.6
Massachusetts	5,245	1,321	3,468	456	25.2	66.1	8.7
Michigan	11,284	4,091	5,953	1,240	36.3	52.8	11.0
Minnesota	13,496	7,857	5,021	618	58.2	37.2	4.6
Mississippi	16,788	9,921	5,693	1,174	59.1	33.9	7.0
Missouri	24,590	9,654	12,718	2,218	39.3	51.7	9.0
Montana	5,266	1,600	3,301	365	30.4	62.7	6.9
Nebraska	15,348	7,966	6,102	1,280	51.9	39.8	8.3
Nevada	2,067	1,070	968	29	51.8	46.8	1.4
New Hampshire	2,527	1,344	989	194	53.2	39.1	7.7
New Jersey	6,798	1,809	4,507	482	26.6	66.3	7.1

State	All Bridges (number)	Condition Rating (number)			Condition Rating (percentage)		
		Good	Fair	Poor	Good	Fair	Poor
New Mexico	4,025	1,466	2,351	208	36.4	58.4	5.2
New York	17,555	6,355	9,528	1,672	36.2	54.3	9.5
North Carolina	18,877	7,840	9,712	1,325	41.5	51.4	7.0
North Dakota	4,285	2,046	1,758	481	47.7	41.0	11.2
Ohio	27,151	16,493	9,324	1,334	60.7	34.3	4.9
Oklahoma	23,220	9,898	11,026	2,296	42.6	47.5	9.9
Oregon	8,235	2,800	5,053	382	34.0	61.4	4.6
Pennsylvania	23,166	7,705	12,263	3,198	33.3	52.9	13.8
Rhode Island	779	168	475	136	21.6	61.0	17.5
South Carolina	9,395	4,142	4,754	499	44.1	50.6	5.3
South Dakota	5,886	1,943	2,925	1018	33.0	49.7	17.3
Tennessee	20,331	8,689	10,801	841	42.7	53.1	4.1
Texas	55,175	27,807	26,579	789	50.4	48.2	1.4
Utah	3,056	1,005	1,988	63	32.9	65.1	2.1
Vermont	2,836	1,494	1,274	68	52.7	44.9	2.4
Virginia	13,997	4,644	8,823	530	33.2	63.0	3.8
Washington	8,358	4,331	3,626	401	51.8	43.4	4.8
West Virginia	7,314	1,719	4,105	1,490	23.5	56.1	20.4
Wisconsin	14,307	7,289	6,031	987	50.9	42.2	6.9
Wyoming	3,114	920	1,964	230	29.5	63.1	7.4
Guam	10	2	6	2	20.0	60.0	20.0
Puerto Rico	2,334	426	1,626	282	18.3	69.7	12.1
U.S. Virgin Islands	24	4	14	6	16.7	58.3	25.0
Total	619,622	278,128	297,908	43,586	44.9	48.1	7.0

Source: Federal Highway Administration (FHWA), National Bridge Inventory, "Bridge Condition by Functional Classification, 2021," at https://www.fhwa.dot.gov/bridge/fc.cfm.

Table A-2. Bridge Obligations by Program: FY2015-FY2021

(current dollars)

Program	FY2015	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	Total FY2015-FY2021
Interstate Maintenance	11,385,907	2,406,944	2,305,999	8,908,364	2,240,105	13,272,298	9,477,424	49,997,043
National Highway Sys.	55,928,169	37,274,844	29,941,503	26,125,570	20,040,402	3,527,492	23,401,906	196,239,887
Surface Transport. Prog.	2,254,453,670	2,409,636,416	2,107,910,876	2,566,044582	2,515,966,628	2,316,890,215	2,173,135,549	16,344,037,666
Nat. High. Perf. Prog.	3,638,484,037	3,910,107,620	3,936,571913	3,789,511,563	4,032,500,809	4,171,434,995	3,997,708,956	27,476,499,892
Nat. High. Freight Prog.	—	237,121,333	106,864,872	260,926,616	155,729,020	273,439,100	146,527,328	1,180,608,268
Transport. Alternatives	2,368,351	6,332,735	3,967,287	3,562,061	7,840,507	4,620,312	25,406,477	54,097,730
Bridge Programs	243,314,396	79,924,642	71,802,855	43,968,419	2,091,860	55,980,591	(38,274,968)	458,807,795
Cong. Mit. & Air Quality	62,542,855	38,121,580	44,430,292	31,197,678	30,500,730	22,739,297	38,935,285	268,467,717
Appalach. Dev. High. Sys.	51,015,156	158,589,439	63,980,429	(586,007)	10,843,215	(3,839,007)	16,112,142	296,115,367
High Priority Projects	10,125,976	17,908,671	15,770,437	13,463,004	6,370,325	3,613,582	14,115,583	81,367,578
Min. Guar.—TEA-21	10,404,647	10,711,287	1,828,744	(266,006)	(2,089,107)	200,855	(1,784,047)	19,006,374
Equity Bonus Exempt	211,958,856	8,778,554	16,978,609	4,605,487	7,038,169	12,624,969	8,089,598	270,074,242
Coord. Bord, Infra. Prog.	2,569,474	3,142,320	6,169,284	(232,028)	(1,000,000)	105,999	—	4,470,410
Safe Routes to School	694,649	—	—	(24,133)	—	—	—	670,516
Planning and Research	—	—	—	130,043	151,500	—	132,140	413,682
CRRSAA	—	—	—	—	—	—	262,853,966	262,853,966
All Others	248,261,223	181,235,160	257,267,156	344,279,171	576,427,938	922,323,453	1,893,522,594	4,423,316,695
Total	6,803,507,637	7,095,006,638	6,665,970,255	7,091,614,385	7,364,652,101	7,796,934,150	8,569,359,933	51,387,044,829

Source: FHWA.

Notes: Displays funds from the Fixing America's Surface Transportation Act (FAST Act; P.L. 114-94), as extended, as well as ongoing obligation of funds from earlier authorization acts. CRRSAA = Coronavirus Response and Relief Supplemental Appropriations Act, 2021 (P.L. 116-260); TEA-21 = Transportation Equity Act for the 21st Century (P.L. 105-178). Totals may not add due to rounding. Amounts in parentheses indicate net de-obligations during the fiscal year.

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