

# Doing More With Less: Maintenance-Oriented Strategies for Transportation Improvements

MODERNIZING INFRASTRUCTURE WEBINAR SERIES

By Carter B. Casady, PhD

April 12, 2024

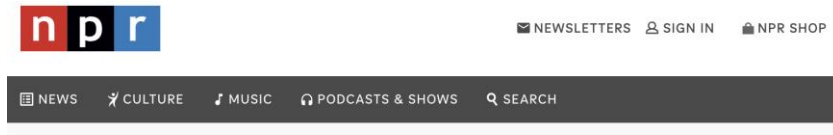
# A Growing Burden: U.S. Investment Gaps (ASCE 2021)

**CUMULATIVE INVESTMENT NEEDS BY SYSTEM BASED ON CURRENT TRENDS, 2020 TO 2029**  
**ALL VALUES IN BILLIONS**

Infrastructure System	Total Needs	Funded	Funding Gap
Surface Transportation <sup>1</sup>	\$2,834	\$1,619	\$1,215
Drinking Water / Wastewater / Stormwater <sup>2</sup>	\$1,045	\$611	\$434
Electricity <sup>2</sup>	\$637	\$440	\$197
Airports <sup>2</sup>	\$237	\$126	\$111
Inland Waterways & Marine Ports <sup>2</sup>	\$42	\$17	\$25
Dams <sup>3</sup>	\$93.6	\$12.5	\$81
Hazardous & Solid Waste <sup>4</sup>	\$21	\$14.4	\$7
Levees <sup>5</sup>	\$80	\$10.1	\$70
Public Parks & Recreation <sup>6</sup>	\$77.5	\$9.5	\$68
Schools <sup>7</sup>	\$870	\$490	\$380
<b>Totals</b>	<b>\$5,937</b>	<b>\$3,350</b>	<b>\$2,588</b>

“Simply knowing how much deferred maintenance exists is not likely, by itself, to mean much to agency managers, elected officials, or the public. Information as to the consequences of the deferrals seems vital to getting appropriate attention to the deferrals” (Hatry, 1994: 14)

# The Consequences of Infrastructure Failures



NATIONAL

## Cracked Memphis Bridge Indefinitely Closed, Disrupting Supply Chain

MAY 12, 2021 · 11:05 PM ET

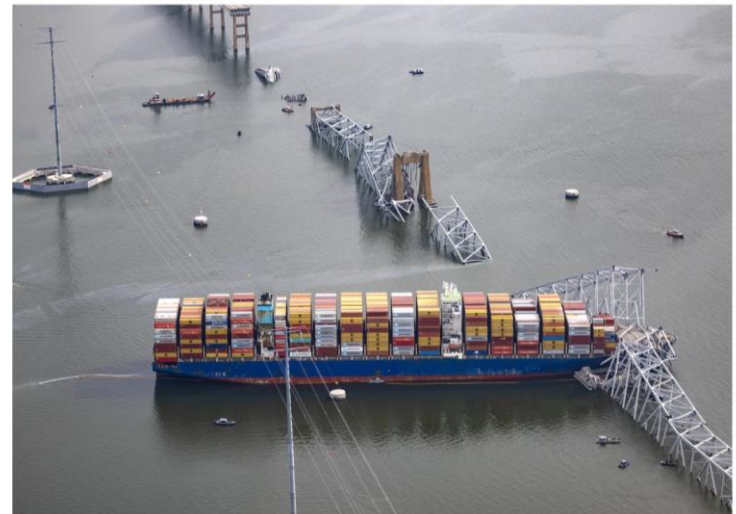
By Vanessa Romo, Debbie Elliott



## The Francis Scott Key Bridge in Baltimore collapses, 6 feared dead

UPDATED MARCH 26, 2024 · 8:01 PM ET

By Jonathan Franklin, Jason Breslow, Rachel Treisman, Ayana Archie



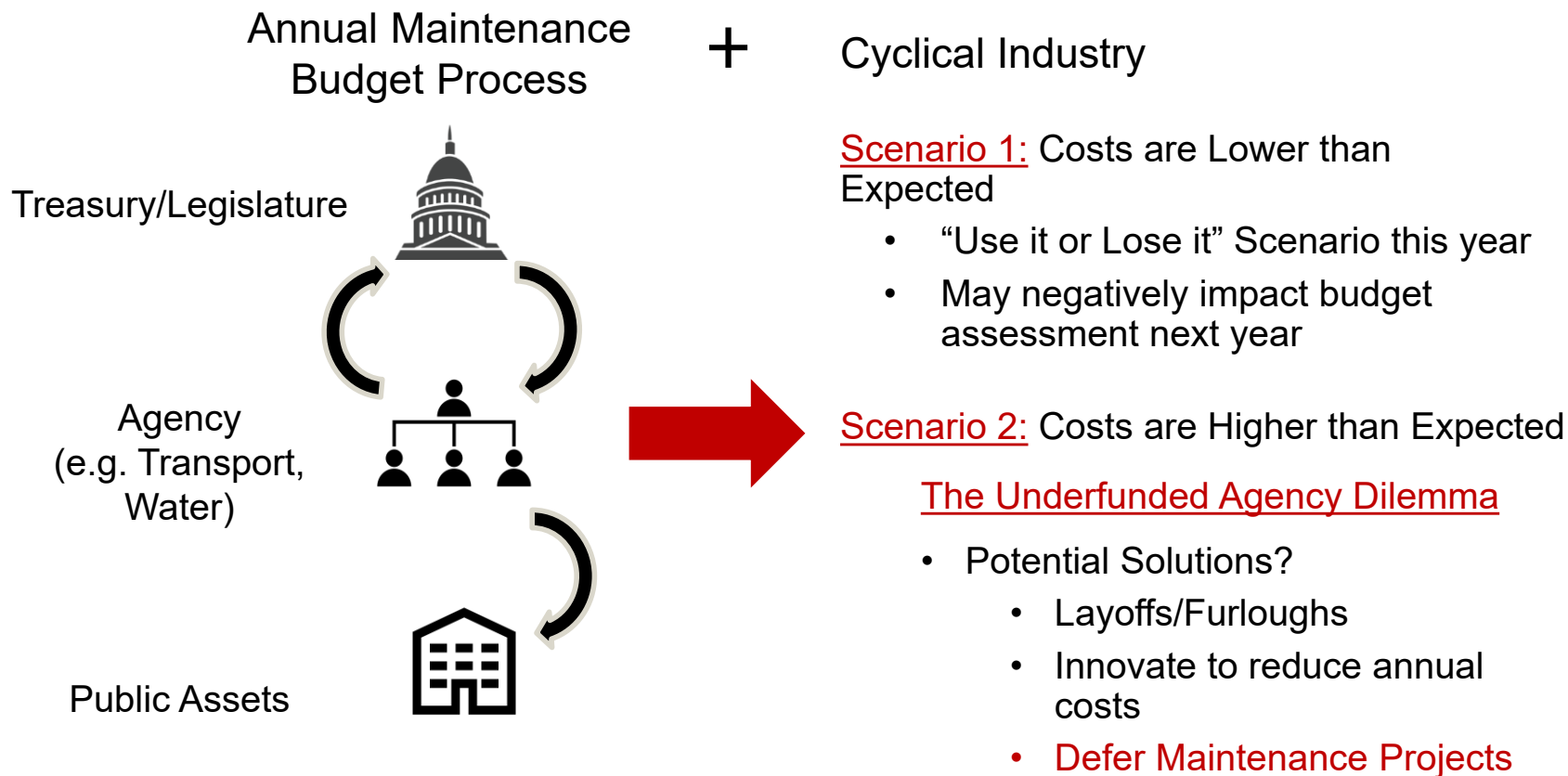
- Infrastructure is invisible . . . until it fails!
- Need to quantify how compounding deferred maintenance affects asset deterioration, performance, resilience, and overall life cycle costs

# Common Explanations of Deferred Maintenance

- 1) Inadequate public-sector asset management proficiency
- 2) Lack of public interest – i.e., no immediate implications
- 3) Lack of political interest – focus on “ribbon cuttings”
- 4) Maintenance is a low government priority – i.e., ad hoc future maintenance planning
- 5) Maintenance competes with other spending requirements
- 6) Political short-termism

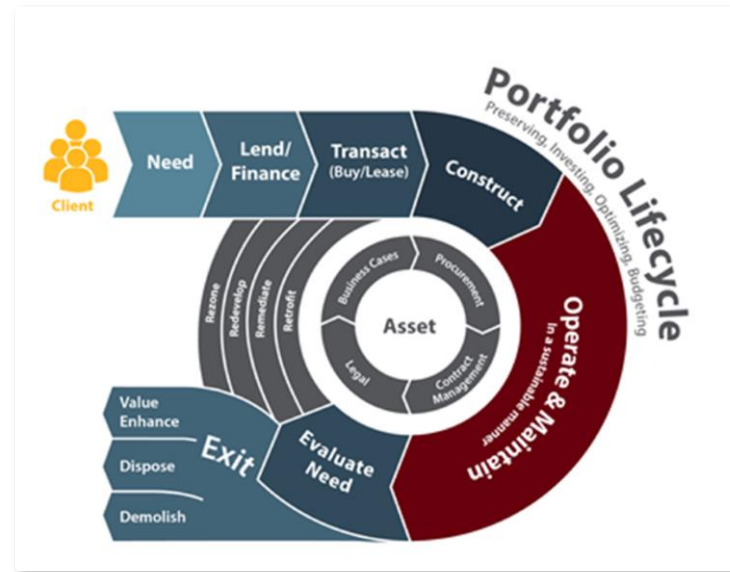
***We “are systematically prone to spend far too little on normal civic infrastructure” (Fallows, 2015)***

# Annual Budget Cycles and Deferred Maintenance



## How do we address chronic deferred maintenance backlogs?

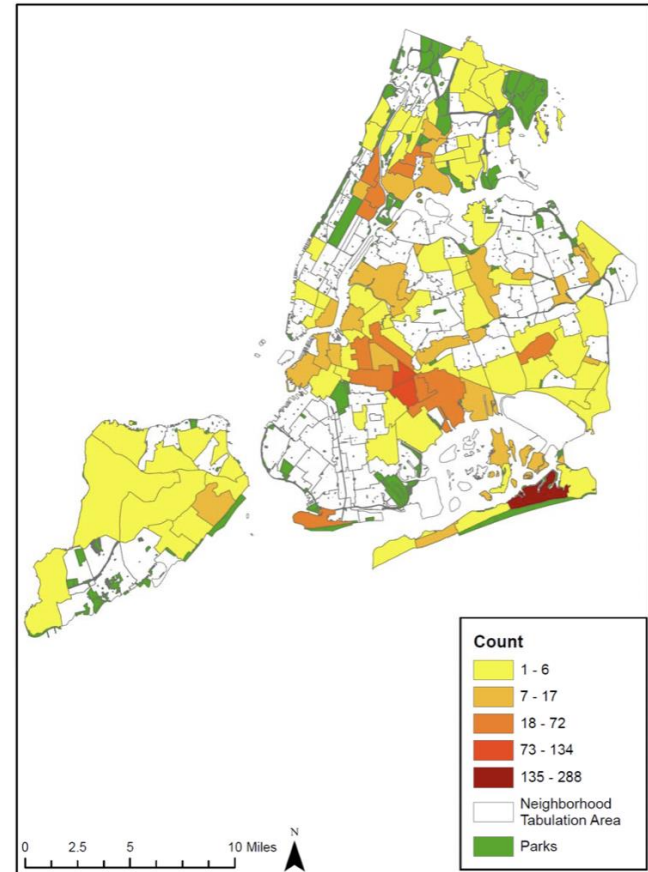
ADOPT A “FIX-IT-FIRST”  
APPROACH TO  
INFRASTRUCTURE  
LIFECYCLE ASSET  
MANAGEMENT



## Step 1: Develop an Asset Inventory

- Owners must know exactly what assets they control
- Although this may seem obvious, many infrastructure owners are not fully aware of exactly what assets they own
- Knowing what the public sector owns and its financial dollar value is the first critical step of any portfolio approach to public infrastructure asset management

Number of New York City Owned Vacant Properties



**Comptroller Stringer Audit Reveals City Owns More Than 1,100 Vacant Lots That Could Be Used To Build Affordable Housing**

February 18, 2016

## Step 2: Assess the Market Value of Inventoried Assets

- Enlist help of experts in infrastructure appraisal and valuation (see USDOT NOFO)
- Will not only help guide owners' decisions about proper management but also give them stronger incentives to undertake proper operation and maintenance of those assets

Asset inventory data:

- **Unique identifiers**
- **Asset Types**
- **Location data** (e.g., addresses and geo-position)
- **Characteristics** (e.g., size, ownership, construction year, etc.)
- **Valuation data**: net book value and current replacement value
- **Condition metrics**: age, facility condition, deferred maintenance
- **Management responsibilities**, for both O&M and capital renewal
- **Ongoing costs** to manage and maintain
- **Relationship to government program use** (i.e., asset categorization)



The screenshot shows the U.S. Department of Transportation website. The header includes the DOT logo and navigation links for 'ABOUT DOT', 'PRIORITIES', and 'CONNECT'. The main content area features a newsroom sidebar on the left with links to 'Newsroom', 'Press Releases', 'Speeches', 'Testimony', 'Medium Blog', 'Events', 'Press Offices', and 'DOT Social Media'. The central headline reads 'U.S. DEPARTMENT OF TRANSPORTATION ANNOUNCES \$57 MILLION AVAILABLE FOR INNOVATIVE FINANCE AND ASSET CONCESSION GRANTS', dated Monday, March 11, 2024. The sub-headline is 'First of its Kind Federal Grants to Explore and Develop Projects Using Public-Private Partnerships Made Possible Thanks to President Biden's Bipartisan Infrastructure Law'. The main text begins with 'WASHINGTON - The U.S. Department of Transportation (DOT's Build America Bureau (Bureau) today released a Notice of Funding Opportunity, NOFO) for a new program authorized by the Bipartisan Infrastructure Law. The Innovative Finance and Asset Concession Grant Program makes \$100 million available over five years to assist public entities in facilitating and evaluating public-private partnerships and exploring innovative financing and delivery opportunities for Transportation Infrastructure Finance and Innovation Act (TIFIA) eligible (TIFIA) eligible projects. The NOFO allocates funds for fiscal years 2022, 2023, and 2024, totaling \$57.72 million. Grants up to \$2 million are available, with the first million requiring no local match. Applications are due May 10, 2024.'



## Step 3: Optimize Infrastructure Asset Utilization

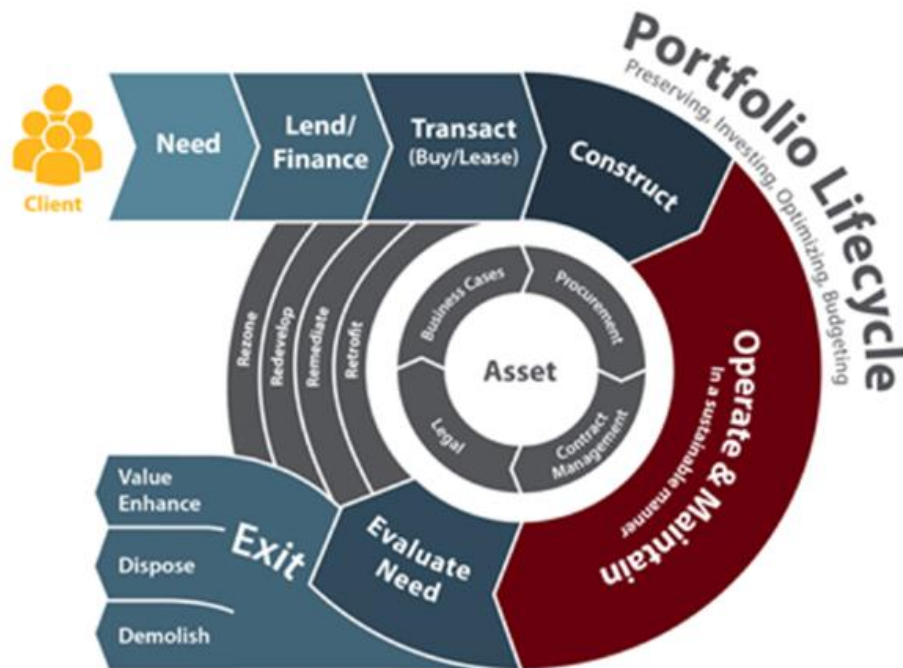
- Conduct a fresh, thorough analysis of the best way to utilize infrastructure assets under a jurisdiction's control
- All options are at play:
  - long-term lease/no-lease PPP-based decision,
  - asset sales,
  - short-term leases/concessions,
  - in-kind asset transfers, and
  - value capture
- The best option may be to do **nothing**, implying certain assets are currently managed as efficiently as possible



Access VFA FacilityView on a desktop, laptop or iPad®.

## Step 4: Asset Monetization and Reinvestment

- Execute key operational / managerial changes, realize value from all transactions undertaken, and reinvest the proceeds into new assets
- Offers a viable, catch-up funding mechanism, allowing public agencies to unlock the substantial latent value embedded in American infrastructure that has accumulated over decades



***This process is designed to “incentivize jurisdictions to recycle capital from existing mature public infrastructure assets toward new productive investments” (Infrastructure Australia, 2016: 90).***

## Example: Indiana Toll Road (ITR)

- In 2005, Indiana leased the ITR and received US\$3.85 billion for the 75-year concession that:
  - implemented electronic tolling,
  - invested in upgrading/widening sections of the toll road, and
  - maintained specified service levels in designated rural / urban areas
- Indiana Department of Transportation (INDOT) used the proceeds to leverage US\$10.8 billion in additional investment for its 10-year surface transportation plan called “Major Moves”
  - included almost 500 miles of new highway,
  - 6,400 miles of rehabilitated or replaced highway,
  - 60 new or reconstructed interchanges, and
  - 1,400 rehabilitated or replaced bridges—i.e., ~25% of the state’s inventory (INDOT, 2020)

## Example: Indiana Toll Road (ITR) (Continued)

- Poole (2018: 23) notes that this deal allowed the state to repay “**\$200 million in outstanding ITR debt and [invest] \$500 million into a ‘Next Generation Trust Fund’, which was designed to provide stable, long-term maintenance funding for the new transportation infrastructure**”
- According to Gilroy and Aloyts (2013), this fund generated roughly US\$755.5 million in interest income as of April 2011, thereby turning “**a [once] revenue-losing asset into an asset that is funding billions in transportation investment now and generating hundreds of millions of dollars for the state’s long-term transportation infrastructure needs**”



# The Benefits of a Establishing a Permanent Fund

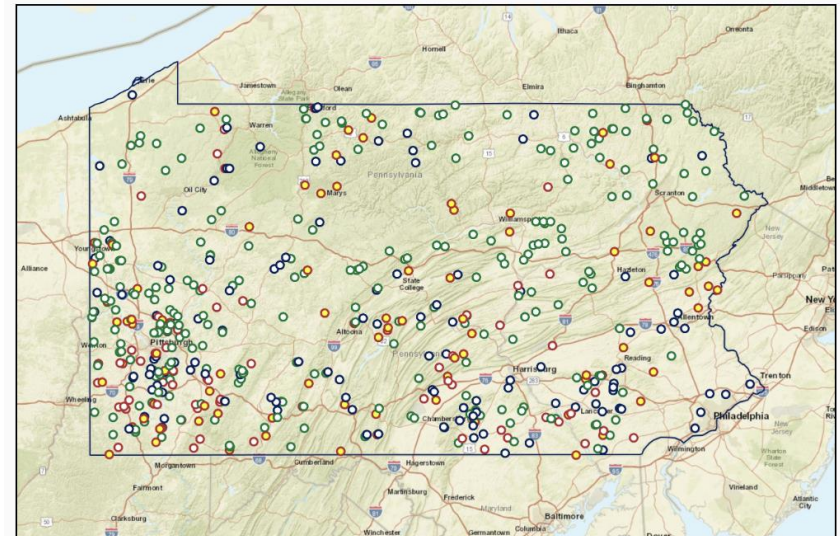
- Using a “fix-it-first” approach, proceeds from asset monetization can be directed to address critical deferred maintenance problems
- Generated funds can be used to capitalize a permanent fund—a specific type of public trust fund
- While most permanent funds currently utilized in Alaska, Texas, Norway, Canada, and other parts of the world traditionally preserve natural resource wealth, capital generated from major asset sales can be deposited in a public trust that invests in transportation infrastructure

## **Benefits:**

- 1) Insulated from a jurisdiction’s general budget and political spending pressures
- 2) Newly raised funds can be used to generate investment income devoted to supporting transportation infrastructure

## Project Bundling: PA Rapid Bridge Replacement P3

- The \$1.1 billion Rapid Bridge Replacement (RBR) project is the largest roadway project in Pennsylvania's history
- RBR is unique because it is the first of its kind in the nation to “bundle” the replacement of hundreds of bridges in a public-private partnership (P3) agreement
- No other P3 project in the country has embarked on a multi-asset, multi-location undertaking of this magnitude
- The project will replace 558 structurally deficient bridges around the state
- Expected to reduce costs and accelerate the replacement of the bridges by allowing for prefabrication, mass production, equipment reutilization, and standardization



## Conclusions

- The 2021 *Infrastructure Investment and Jobs Act (IIJA)* is expected to significantly help state governments address their more than \$1 trillion in unfunded maintenance liabilities (Wei, Mak, & Connolly, 2023)
- But ... even the latest round of federal funding will not be enough to close the investment gaps
- A “fix-it-first” approach to infrastructure asset management allows public agencies to do more with less by:
  - 1) Monetizing underutilized assets to fund infrastructure maintenance,
  - 2) Relieve pressure on state budgets, and
  - 3) Transfer O&M costs and risks to private firms

***However, “[a]n organization must [first] know what assets it owns and manages, their locations, their condition, their management responsibilities, their ongoing costs to manage and maintain, and their relationship to government program use” (IO, 2019: 17)***

## References

- Fallows, J. 2015. Why we can't think straight about public spending: California high-speed rail, and the latest USAF bomber. *The Atlantic*.  
<https://www.theatlantic.com/notes/2015/11/public-vs-private-infrastructure-california-high-speed-rail-and-the-latest-usaf-bomber/413584/>
- Florida, R. 2018. What's Manhattan's land worth? Try "Canada's entire GDP." *CityLab*.  
<https://www.citylab.com/life/2018/04/what-manhattans-land-is-worth/558776/>
- Gilroy, L., & Aloyts, D. 2013. *Leasing the Indiana toll road*. Reason Foundation.
- Hatry, H. P. 1994. Issues in deferred maintenance. US Army Corps of Engineers, Water Resources Support Center, Institute for Water Resources.
- Indiana Department of Transportation. 2020. *Major moves*.  
<https://www.in.gov/indot/current-programs/major-moves/>
- Infrastructure Australia. 2016. *Australian infrastructure plan: Priorities and reforms for our nation's future*. Australian Government.
- Infrastructure Ontario. 2019. *Overview—Capital planning: What we do . . . what we deliver . . . and value proposition*. Presentation at Infrastructure Ontario, Toronto, ON, Canada.
- New York City Comptroller. 2016. Comptroller stringer audit reveals city owns more than 1,100 vacant lots that could be used to build affordable housing. *Office of the New York City Comptroller*.
- Poole, R. J. 2018. *Asset recycling to rebuild America's infrastructure*. Reason Foundation.
- Wei, E., Mak, R., and Connolly, S. 2023. "How Bipartisan Infrastructure Law Can Help State and Local Governments Meet Needs." *The Pew Charitable Trusts*.  
<https://www.pewtrusts.org/en/research-and-analysis/articles/2023/04/12/how-bipartisan-infrastructure-law-can-help-state-and-local-governments-meet-needs>