

**Carte**graph

# ***PRESERVE YOUR PAVEMENT***

*A ROAD MAP TO  
DATA-DRIVEN  
BUDGETING*

An Introduction for Local Government

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## *A ROAD MAP TO DATA-DRIVEN BUDGETING*

An Introduction for Local Government

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Your street and roadway network represents your biggest, most expensive asset. The commitment to repair and preserve pavement can demand up to 20 percent of an annual resurfacing budget. And according to the 2017 Infrastructure Report Card, one out of every five miles of highway pavement is in poor condition, and America's roads have a significant and increasing backlog of rehabilitation needs.

While keeping up financially and maintenance-wise represent tough challenges, a sustainable and smart asset management program will save you money and improve the condition of your pavement network.

This white paper will demonstrate the benefits of data-driven budgeting with a discussion of these five key areas:

01

The pavement management system: what it is and how it works

02

The importance and benefits of a pavement management system

03

How to put your pavement management data to work

04

Choosing the right system to meet current and future needs

05

How to approach data-driven budgeting and analysis

# WHAT IS PAVEMENT PRESERVATION?

## AN OVERVIEW

According to the U.S. Department of Transportation Federal Highway Administration (FHWA), pavement preservation represents all the activities governments undertake to provide and maintain serviceable roadways. That is, performing the right type of work at the right time to extend the life of the pavement segment.

- *It includes corrective maintenance, preventative maintenance, and minor rehabilitation projects.*
- *It excludes new or reconstructed pavements as well as pavements requiring major rehabilitation or reconstruction.*

In addition, the FHWA outlines that a pavement preservation program is composed of activities that:

- Preserve your pavement investment
- Extend the life of your pavement
- Enhance your pavement performance
- Ensure cost-effectiveness, and
- Reduce citizen delays

The FHWA has also quantified the benefits of road, highway, and bridge improvements. For each dollar spent, the return comes to \$5.20 in the form of lower vehicle maintenance costs, decreased delays, reduced fuel consumption, improved safety, lower road and bridge maintenance costs, and reduced emissions from improved traffic flow.

A sound pavement preservation program slows the deterioration of roads, as opposed to adding capacity or increasing structural value. Think of pavement preservation as a process that extends the “shelf life” of your roads, much like a refrigerator slows—but doesn’t prevent—your milk from spoiling.

# **THE PAVEMENT MANAGEMENT SYSTEM**

## **WHAT IT IS, HOW IT WORKS**

A data-driven pavement management system realizes two major goals of a pavement preservation program:

1. To preserve good pavement segments in good condition for longer periods of time
2. To perform major rehabilitation at the right time to avoid costly reconstruction later on.

A pavement management system helps agencies optimize their cost so the need for major rehabilitation is balanced with the preservation of good pavement. It is a high-performance database that:

- Provides a complete inventory of all your jurisdiction roads
- Tracks all records of repair activities and conditions inspections
- Makes work and asset data easily accessible in the office or on the go
- Integrates with GIS maps, like Esri ArcGIS
- Supports data-driven decisions with budget or condition-based analysis

In sum: pavement management systems help high-performance governments optimize their pavement maintenance and preservation activities so that over time, the overall condition of the network increases and pavement is well maintained.

## **THE IMPORTANCE AND BENEFITS OF A PAVEMENT MANAGEMENT SYSTEM**

A pavement management system takes what was once an activity filled with guesswork and approximations and turns it into a powerful, data-leveraged tool that creates maximum efficiencies in budgeting, scheduling, and tracking.

Here are just a few benefits of a pavement management system:

- Incorporating pavement preservation into the overall practice of managing your pavement network is a cost-effective way to extend pavement life, enhance safety, increase citizen satisfaction, and improve pavement performance. (FHWA)
- Every dollar spent on pavement preservation, aside from the \$5.20 gained in immediate benefits, could save you \$20 down the line that would have been needed for major rehabilitation projects.
- Performing major rehabilitation on pavements at the right time helps you avoid costly reconstruction at a later date.
- With effective pavement preservation, agencies can better meet system-wide pavement performance measures even while funding levels remain constrained. (FHWA)

In fact, an effective pavement management system goes hand-in-hand with the foundation of smart asset management:

- Track and predict condition over time
- Perform the right work at the right time
- Evaluate various funding scenarios
- Optimize budgets to achieve results

# **PUTTING YOUR DATA TO WORK**

## **A 7-STEP APPROACH**

The commitment to capture the right pavement data is just the beginning of a comprehensive pavement management strategy. Good network data acts as the springboard for a systematic process where you collect information, analyze it, and use your findings and trends to plan for future preservation, maintenance, and rehabilitation.

The process can be summarized through these seven essential steps:

- 1 COLLECT DATA**  
Good data forms the foundation for effective pavement management. Current, accurate data tells you everything from the route number and its length to pavement type and number of lanes.
- 2 ASSESS CONDITION**  
Thorough inspections based on ASTM's Pavement Condition Index (PCI) or Pavement Surface Evaluation and Rating (PASER) methodologies will tell you the exact condition of your roads—and help you determine whether they are getting better or worse.
- 3 VALUATE**  
Consider each pavement segment's purpose and place in your overall infrastructure. What is it worth? What does it cost to maintain? Use the answers to these questions to prioritize your network and the resources necessary to sustain it.
- 4 GAUGE PERFORMANCE**  
Identify the factors that measure your pavement performance. What represents a normal deterioration rate? What are traffic volumes and community demand like? Understanding these expectations helps develop a plan for maintaining your entire network.

5

### CREATE A STRATEGY

There's a time to preserve and a time to rehabilitate. Based on the analysis performed at each of these steps, you can optimize your resources and investment strategies for operations, preservation, maintenance, and rehabilitation.

6

### PUT INTO PRACTICE

You will inventory, inspect, preserve, and ultimately, rehabilitate every network segment. Then you will do it all over again. With a data-driven strategy in place, you'll steadily improve or maintain your roadway network conditions and ensure long-term affordability.

7

### FOLLOW THROUGH

You've made the commitment to capture the data—now don't let it sit on the shelf. Support your investment with regular, proactive monitoring that keeps your organization working efficiently, and ensures your roadways are maintained to your satisfaction and the public's benefit.

## **CHOOSING THE RIGHT SYSTEM TO MEET YOUR CURRENT AND FUTURE NEEDS**

While a variety of pavement management solutions populate the market today, it's important to find a solution that will fit a number of different criteria, including:

### **USER-CENTRIC DESIGN**

When choosing a system, consider the ease of use and intuitiveness of its design. A clean, simple interface helps street teams concentrate on the task at hand, instead of forcing them to muddle through inefficient software that makes tasks more difficult to manage and complete.

### **MOBILITY**

The pavement management system you choose must provide optimal power and functionality for the mobile workforce. Look for a system that performs as well—if not better—on a mobile device as it does in the office. That way, no matter where your pavement is located, your team has everything they need to access and complete work accurately and on time.

### **DATA ORGANIZATION**

Does the system make it easy to input, view, and find your pavement data? If not, look elsewhere. Quick, easy access to well-organized data—such as a pavement segment's work and inspection history—helps your crew make smarter, more informed decisions when performing work in the office or on the go.

### **ADAPTABILITY**

Identify your technology needs today and consider how those needs might evolve. Use that knowledge to choose technology that will expand and grow with the needs of your community and the operations that service it.

### **CROSS FUNCTIONALITY**

Any pavement management system should meet the needs of multiple departments and areas of your organization. Organization-wide thinking—along with the communication and collaboration that makes it successful—isn't possible with system that creates data silos. Productivity and decision making improve when every user has access to the best data available.



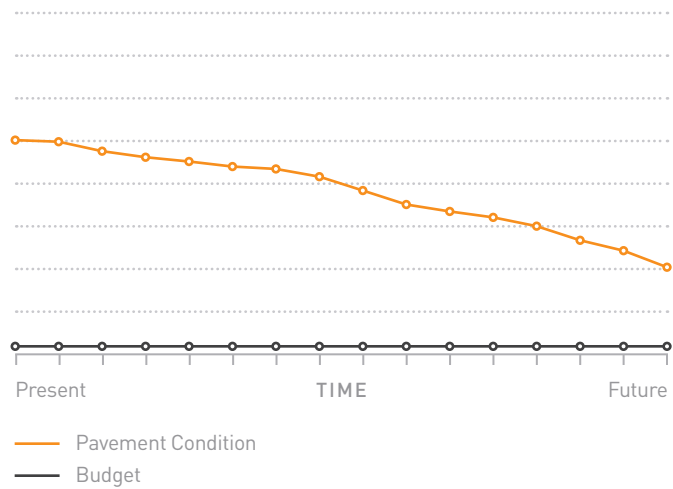
## DATA-DRIVEN BUDGETING AND ANALYSIS

Data-driven budgeting leads to a more effective, efficient, and productive organization, and high-performance governments across the country are using pavement management systems to create custom scenarios that help investigate different target-conditions and funding levels.

So, how much money should you allocate for your pavement management program? There are five sets of budget and condition-based analyses you can use to fuel data-driven decisions:

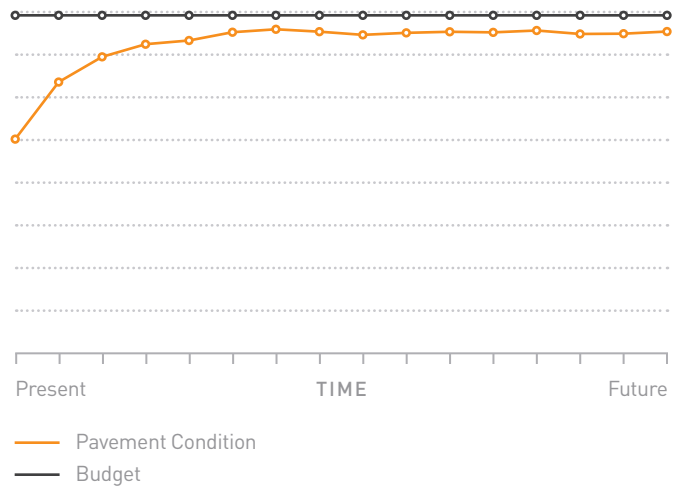
### ZERO BUDGET

This scenario analyzes how the pavement network condition deteriorates if no funds are available for pavement repair activities.



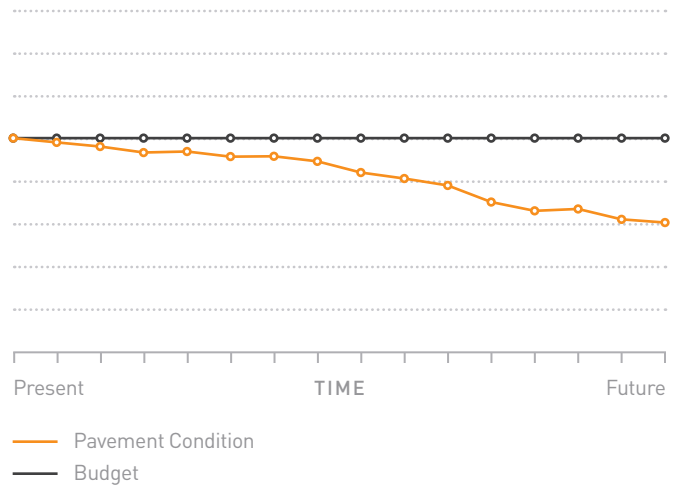
### UNLIMITED BUDGET

This scenario analyzes how the pavement network condition improves if unlimited resources are available for pavement repair activities.



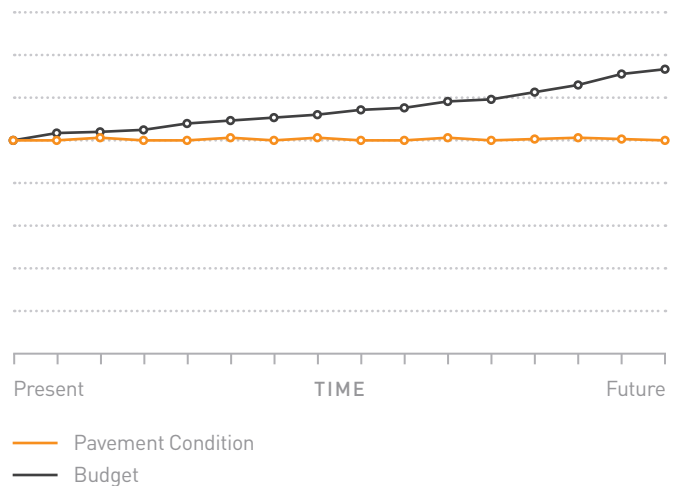
### CURRENT BUDGET

This scenario analyzes how the pavement network conditions changes if the current funding for pavement repair activities stays the same.



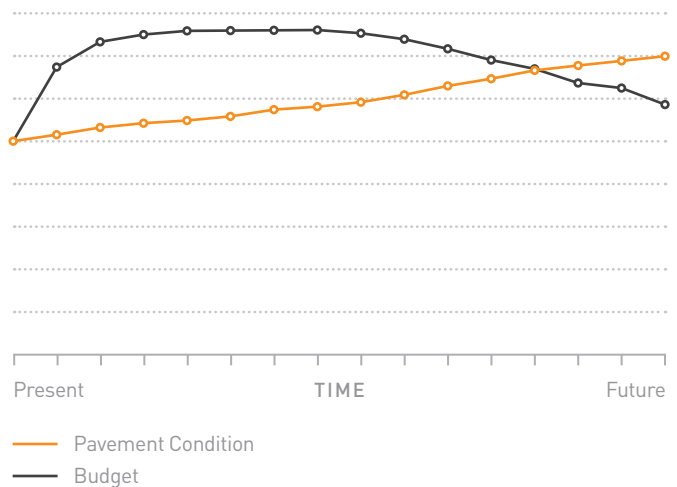
### MAINTAIN CURRENT CONDITION

This scenario analyzes how the annual spending of a local government changes if they want to maintain the same condition over a period of time.



### REACH TARGET CONDITION

This scenario analyzes how the annual spending of a local government changes if they want to reach a target condition over a period of time.



*Note: These scenarios are hypothetical and the trends shown may not apply to all pavement networks.*

Not only do these predictive analyses take the guesswork out of planning for the future, the results offer a great starting point for project-level planning and workplan development. Furthermore, city, county, and state engineers can use these tools to clearly illustrate the effect time and budget have on the condition of your pavement segments to anyone from city council members and county commissioners to street crews and citizens.

## **NOW YOU KNOW**

While the 2017 Infrastructure Report Cards give American roadways a “D” grade, they also spotlight the critical importance and value of new methods to determine when, where and how to best preserve pavement. This includes a mobile-ready, user-friendly, data-driven pavement management system.

In summary:

- Pavements are expensive to replace.
- Pavement preservation helps save you money.
- A working pavement management system is needed for effective pavement preservation.
- Predictive budget and condition-based analysis help forecast future needs.
- By using pavement management systems and pavement preservation programs, your local government can eliminate the guesswork and make data-driven budgeting decisions.

Now that you understand the tremendous value of having a data-driven pavement management system in place, you can begin thinking about your organization’s approach to implementation. By using the insight outlined in this paper, you’ll position yourself to become a high-performing government that make better decisions about your pavement management system as it fits into your overall roads program and budgeting.

## ***IF YOU'RE INTERESTED IN PAVEMENT, YOU'LL LIKE THESE RESOURCES:***

### ***ABOUT CARTEGRAPH***

Cartegraph is in the business of building high-performance government. They offer software solutions that help local government agencies manage their physical assets and associated operations. With Cartegraph, users optimize the life of their infrastructure, deploy maintenance resources efficiently, and increase productivity.

To build high-performance governments, Cartegraph uses a comprehensive, three-pronged approach that combines success coaching, expert consulting, and state-of-the-art software solutions for asset, work, and resource management to help agencies capture data, analyze it, and prepare for the future. For more information, visit [cartegraph.com](https://cartegraph.com).