

# Transportation Reboot:

Restarting America's Most Essential Operating System

The Case for Capacity: To Unlock Gridlock, Generate Jobs, Deliver Freight, and Connect Communities



# Unlocking Gridlock

<http://ExpandingCapacity.transportation.org>

PART **1** OF A SERIES

# Acknowledgements

Much of the material cited in this report, including the estimates of capacity increases required, is drawn from research published in May 2007 by the Transportation Research Board's National Cooperative Highway Research Program (NCHRP). The report, *Future Options for the Interstate and Defense Highway System* can be accessed at [http://onlinepubs.trb.org/onlinepubs/trbnet/acl/NCHRP\\_20-24\\_52Task10\\_NCHRPFinal.pdf](http://onlinepubs.trb.org/onlinepubs/trbnet/acl/NCHRP_20-24_52Task10_NCHRPFinal.pdf).

The objective of the research project was to develop a potential vision for the future of the U.S. Interstate Highway System. The report was prepared by a study team led by David Gehr and Steve Lockwood of PB Consult, Gary Mar- ing of Cambridge Systematics, Inc., Kevin E. Heanue and Alan E. Pisarski.

The research was sponsored by AASHTO and the Federal Highway Administration, and was guided by a panel chaired by Harold E. Linnen- kohl, Georgia DOT (retired); and included Allen D. Biehler, P.E., Secretary, Pennsylvania DOT; John F. Conrad, P.E., Washington State DOT; Dr. David J. Forkenbrock, University of Iowa; Dr. Clay McShane, Northeastern Univer- sity; Debra L. Miller, Secretary, Kansas DOT; Thomas E. Norton, Colorado DOT (formerly); Kenneth Orski, Urban Mobility Corporation; Dr. Bruce E. Seely, Michigan Technological University; MG David A. Sprynczynatyk, North Dakota Army National Guard; and LTG Kenneth R. Wykle, National Defense Transportation Association.

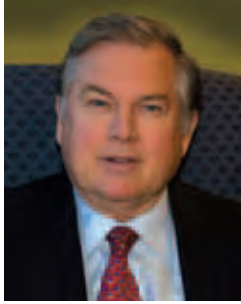
The analysis period considered in the *Future Options Report* was the 30 years from 2005 to 2035. The National Surface Transportation Policy and Revenue Study Commission, in its 2008 report, *Transportation for Tomorrow*, looked at what the country's surface transportation needs would be by 2050. In order for this report to be comparable to that of the National Commission's, AASHTO based its findings on the research conducted by PB, Cambridge Systematics, Pisarski and Heanue, but presented its recommendations using the 2050 time horizon. We have also updated the travel demand forecasts us- ing more recent data from AASHTO's 2009 *Bottom Line Report*.

Additional information in the report was gleaned from *Commuting in America III*, authored by Alan E. Pisarski under a joint project of the NCHRP and the Transit Cooperative Research Program (TCRP) and published in October 2006. Christine Becker also contributed to the report.

## Foreword

*In Utah—when the new 14-mile Legacy Parkway north of Salt Lake City opened in late 2008, motorists saw their commute drop from an average of 44 minutes to 14 minutes.*

*In Maryland and Virginia—expansion of the Woodrow Wilson Bridge from 6 to 12 lanes to relieve a major Interstate system bottleneck is saving drivers and truckers 40 minutes a day.*



John Horsley  
Executive Director

Expanding the ability of the transportation system to meet the needs of the traveling public is critical to the health of our economy and the quality of life of our citizens. Meeting future needs will require a balanced approach, which preserves what has been built to date, improves system performance, and adds substantial capacity in highways, transit, freight rail and intercity passenger rail.

Some advocacy groups, however, want to take the country down a different path. They want to limit new highway capacity, and shift resources away from highways to transit and intercity passenger rail. And they want to see this approach imposed on states from the national level.

We disagree.

Does AASHTO support investing more in transit? Absolutely. States today actually invest more in transit than does the federal government. In 2007, states spent \$13.3 billion on transit, compared to federal funding of \$10.7 billion. AASHTO supports doubling of transit ridership by 2030 and increasing federal transit funding by 89 percent.

**Expanding highway capacity is not the only thing that will be required to meet future mobility needs, but it will be a principal part of what will be required.**

Does AASHTO support investing more in intercity passenger rail? Of course. State departments of transportation have called for investing \$50 billion during the next six years to expand intercity passenger rail service.

But transit and intercity passenger rail investments alone cannot begin to meet the nation's transportation needs. A more balanced approach is needed that recognizes how Americans choose to travel. Today 95 percent of passenger travel in America is made by car, motorcycle and truck, and 93 percent of freight by value moves on our highways. *Expanding highway capacity is not the only thing that will be required to meet future mobility needs, but it will be a principal part of what will be required.*

# Unlocking Gridlock: Key Findings

## Population increases are putting strains on existing transportation networks, and are increasing the need for new capacity.

- Since 1956 when the Interstate Highway Act was enacted, the U.S. population has grown by 140 million. Unlike countries in Europe and Asia whose populations are expected to decline, the U.S. is growing.
- In 10 years the U.S. population will grow by 27 million people, more than the number of people who currently live in Texas.
- America's population is forecast to increase from 308 million today to more than 420 million by 2050.
- Close to 80 percent of America's growth and economic development has concentrated in metropolitan areas. Between 1950 and 2000, the number of people living in metropolitan regions increased from 85 million to 225 million. By 2050 that number is expected to reach nearly 335 million.

## Significant investment is needed to keep America moving.

- Travel on the U.S. highway system has increased five-fold over the past 60 years from 600 billion miles driven to almost three trillion in 2009.
- Annual travel is expected to climb to nearly 4.5 trillion miles by 2050, even with aggressive strategies to cut the rate of growth to only one percent per year.
- Drivers with a 30-minute commute lose 22 hours (nearly three full work days) annually sitting in traffic.
- The U.S. Department of Transportation's *2008 Conditions and Performance* report, released in early 2010, projects an annual highway investment need of about \$175 billion. Of that amount, \$85 billion is needed for system rehabilitation, \$71 billion is needed for system expansion and \$18 billion is needed for system enhancements such as safety improvements.
- If most or all of our capital investments were made in system rehabilitation and little to none in adding needed capacity, the condition of the nation's roads and bridges would improve, but traffic would grind to a halt.

## The Interstate Highway System is the backbone of the nation's transportation network and must continue to play a strategic role.

- Representing only one percent of total highway miles, today's Interstates carry 24 percent of all traffic and 41 percent of combination-vehicle truck traffic.

“Today, drivers with a 30 minute commute still lose 22 hours (nearly three full work days) annually sitting in traffic. As the economy rebounds, congestion levels will also rebound, unless the nation builds the capacity needed.”



- Between 1980 and 2006, traffic on the Interstate System increased by 150 percent, while Interstate capacity increased by only 15 percent.
- Because capacity has not kept pace with travel demand over the past four decades, the amount of traffic experiencing congested conditions at peak hours in the nation's most urban areas on the Interstate System doubled from 32 percent to over 67 percent.
- In many metro areas, the bulk of traffic is carried on urban Interstates and state arterials, rather than on city and county arterials or local streets. For example, in the Austin, Texas metro area, only seven percent of the highway network is made up of state arterials and Interstates, but those roads carry 80 percent of the traffic.

**Meeting metropolitan mobility needs will require a balanced approach that preserves what has been built to date, improves system performance, and adds substantial capacity in highways, transit, freight rail, and intercity passenger rail.**

- Highways play a dominant role in providing mobility for the American public, carrying 95 percent of passenger trips and 93 percent of freight by value. Expanding highway capacity is not the only thing that will be required to meet future mobility needs, but it will be a principal part of what is needed.

**U.S. DOT's 2008 *Conditions and Performance Report*, published in 2010, found that to meet highway future needs over the next 20 years, 48.7 percent of capital investment should go into system rehabilitation and 41 percent should go to system expansion.**



**“The results of inaction are clear. Unless the nation creates adequate highway, transit, and railroad capacity, the nation's economy could slow to a standstill.”**

- To reduce current congestion and meet future needs, the AASHTO 2007 *Future Options for Interstate Highways* study found that the equivalent of 30,000 additional lane-miles should be added to the existing 85,000 lane-miles of urban Interstate. Additionally, another 40,000 lane-miles need to be added to the existing urban segments of the National Highway System.
- AASHTO has also called for doubling transit ridership by 2030, and increasing federal transit assistance by 89 percent. AASHTO has also called for investing \$50 billion in high speed and intercity passenger rail during the next six years.
- Massive investments in transit capacity and a quadrupling of transit ridership cannot substitute for additional increases in Interstate highway capacity needed to accommodate longer-distance passenger and freight movements and the through-trips that continue to grow.
- AASHTO has called on Congress to provide \$375 billion over the next six years in federal highway assistance, 90 percent distributed by formula to the states. A significant portion of these funds should be provided to fund the Interstate Highway capacity needed. These dollars should be systematically programmed by states and their MPOs to meet community needs, especially the needs for increasing metropolitan mobility and reducing congestion.

### **AASHTO's four-pronged approach to restarting America's most essential operating system—its transportation network:**

- Preserve and modernize the system.
- Improve system performance.
- Shift trips to other options, such as intercity passenger rail, transit, bicycles or walking; and shift freight from trucks to rail.
- Add the highway capacity needed to sustain America's future.

### **Key Examples of Capacity Needs Across America:**

**Find Your State at <http://ExpandingCapacity.transportation.org>**

Whether it's a traffic-choked interchange or a out-dated bridge inadequate to accommodate today's traffic, states have a long and urgent list of capacity improvement projects. In response to an AASHTO survey, state departments of transportation have identified some of their high priority needs, which are listed in Appendix A. Full details on these projects, and many more, are available at <http://ExpandingCapacity.transportation.org>.

## TRANSPORTATION REBOOT

# Restarting America's Most Essential Operating System

Like an overloaded computer, decades of underinvestment have frozen the advancement of our nation's transportation network at a time when our growing population needs jobs and our economy needs a competitive edge.

Three key challenges loom ahead—easing urban congestion; supporting mounting freight demands; and connecting rural economies to the national network. In each case, an essential solution is enabling our transportation system to grow, where ever and however it is needed.

In this first of a three-part report, *Transportation Reboot* describes what is changing in America and why those changes demand new transportation capacity. Future segments address the capacity increases required to meet the burgeoning freight demand, and to access the economic might of rural America.

**"Between 1980 and 2006, traffic on the Interstate System increased by 150 percent, while Interstate capacity increased by only 15 percent."**

## Inside:

### 1. System Overload

- Population
- Travel Growth
- Inadequate investment
- Paying the Price of Congestion

### 2. It Is Your Father's Interstate! But It Doesn't Have to Be

- Aging Arteries
- What's So Great about an Interstate?
- Interstate Expansion Needs

### 3. The Opportunities of Expansion

- Making the System Swifter, Safer, Smarter, Sustainable
- Preservation Includes Performance

### 4. Urban Answers

- A Four-Point Plan for Urban Mobility
- Investments in Transit, Intercity Rail
- Adding Highway Capacity







## PART 1

# System Overload

Every 14 seconds another person is added to America's population. A new baby arrives every eight seconds. A new immigrant arrives every 37 seconds. Between 2009 and 2010, 2.9 million people were born or arrived in the U.S., bringing our total to 308.4 million. America is a growing nation, adding the equivalent of the population of Canada every ten years.

Similarly, travel on the U.S. highway system has increased—five-fold during the past 50 years from 600 billion miles driven (or vehicle miles traveled, often referred to as VMT) in 1956 to 2.9 trillion in 2009. As the population grows, and the economy expands, travel will still climb to nearly 4.5 trillion miles per year by 2050, even with aggressive strategies to slow the rate of growth to only one percent per year.

## By the year 2050:

- U.S. population will increase from 308 million to 420 million.
- The number of people living in metropolitan areas will approach 335 million—100 million more than today.
- The amount of freight tonnage moved in the United States will at least double—from 15 billion tons of goods transported per year to more than 30 billion tons.
- Annual travel on highways will grow from 2.9 trillion miles in 2009 to 4.5 trillion in 2050, even with strategic efforts to reduce the rate of growth in the number of miles driven.
- Freight carried by truck is expected to increase by more than 100 percent.

**If most or all of our capital investments were made in system rehabilitation and little to none in adding needed capacity, the condition of the nation's roads and bridges would improve, but traffic would grind to a halt.**

## America Is Growing

The U.S. Census Bureau projected the total U.S. population on January 1, 2010 at **308.4 million people**—up **2.9 million** in just one year from New Year's Day 2009.

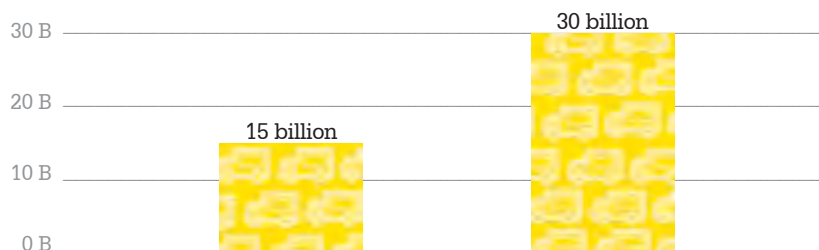
*By the year 2050:*

### POPULATION WILL GROW



The U.S. population will increase from 308.4 million to over **420 million**. The number of people living in metropolitan areas will approach **335 million**.

### FREIGHT WILL GROW



The amount of freight tonnage moved in the United States will at least double—from 15 billion tons of goods transported per year to more than **30 billion tons**. Freight carried by truck is expected to increase by more than **100 percent**.

### TRAVEL WILL GROW



Annual travel on highways will grow from **2.9 trillion** miles in 2007 to **4.5 trillion** in 2050, even with strategic efforts to reduce the rate of growth in the number of miles driven.

Nationwide, congestion is costing more than four billion hours of annual travel delay and 2.9 billion gallons of wasted fuel. According to the chief economist of the U.S. Department of Transportation, the nation is already paying nearly \$170 billion per year for congestion and unreliability and the cost is growing at more than twice the rate of the overall economy. This constitutes a significant drag on the national economy, global competitiveness and the quality of life.

The current recession illustrates the close tie between economic prosperity and transportation. As the economy slowed, so did truck traffic hauling consumer goods, imports and exports. While congestion dropped by 30 percent in late 2007 and early 2008, it has now stabilized. Due, in part, to the loss of 8.3 million jobs in the economy over the last two years, congestion levels have been “reset” to the level experienced in 2005. But no one would consider that a good thing for America.

Even at the 2009 reset level, drivers with a 30 minute commute still lose 22 hours (nearly three full work days) annually sitting in traffic, according to the newly released INRIX National Traffic Scorecard. As the economy rebounds, congestion levels will also rebound, unless the nation builds the capacity needed.

The results of inaction are clear. Unless the nation creates adequate highway, transit, and railroad capacity, the nation's economy could slow to a standstill. Trucks would take longer to get their goods to stores, leaving empty shelves, shortages or increased costs. Commuters would have to add more hours to their day getting to and from work, taking away precious time with families and friends. Chores will take longer to accomplish, adding frustrations. Therefore, additional highway, transit and rail capacity is critical for a healthy economy, jobs and the future quality of life for the country.

## Where the Growth Is

Census estimates released in 2009 show that population between 2000–2009 grew in every state. California remained the most populous state, with about 36.9 million people. Rounding out the top five states were Texas (24.8 million), New York (19.5 million), Florida (18.5 million) and Illinois (12.9 million). Five states (North Dakota, West Virginia, Louisiana, Rhode Island, and Michigan) grew by less than one percent.

The state census projections released in 2009 show the dramatic growth experienced primarily in the South and West in the past decade.

- Texas added more than 3.84 million people
- Florida grew by 2.49 million people
- Georgia grew by 1.59 million people
- Arizona added 1.43 million people
- Others in the top ten include North Carolina (1.34 million); Washington (753,000); Colorado (697,000); Nevada (625,000); Utah (554,000) and South Carolina (551,000).



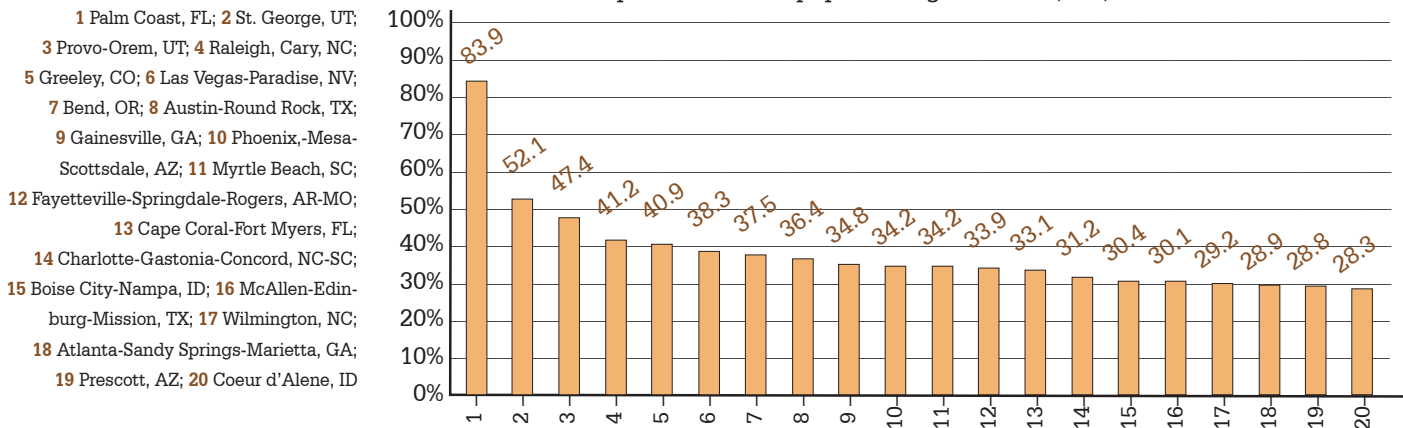
## Nine More Metropolitan Regions Top 1 Million Since 1990

In 1990 there were 43 urban areas, defined by the Census Bureau as Metropolitan Statistical Areas (MSA's), with populations of one million and above. By 2009, the number of urban areas with regional populations of one million and above had increased to 52.

Just as Census estimates show dramatic growth in southern and western States, Census estimates show urban areas in the South and West also experienced the most dramatic growth. Of the 20 fastest growing MSAs from 2000 to 2009, four are in North and South Carolina, three in Texas, two each in Utah, Florida, Georgia, Arizona and Idaho, and one each in Colorado, Oregon and Arkansas. These 20 cities are all sizes, ranging from the smallest (and fastest growing), Palm Coast, FL expected to nearly double in size adding over 40,000, to the largest, Atlanta, adding 1.2 million or nearly 30 percent of its current population. All told, the 20 fastest growing urban areas will expand by 28 to 80 percent, adding a total of 5,000,000 people.

### 20 Fastest Growing Metropolitan Areas 2000–2009

Represents urban population growth of 5,301,772

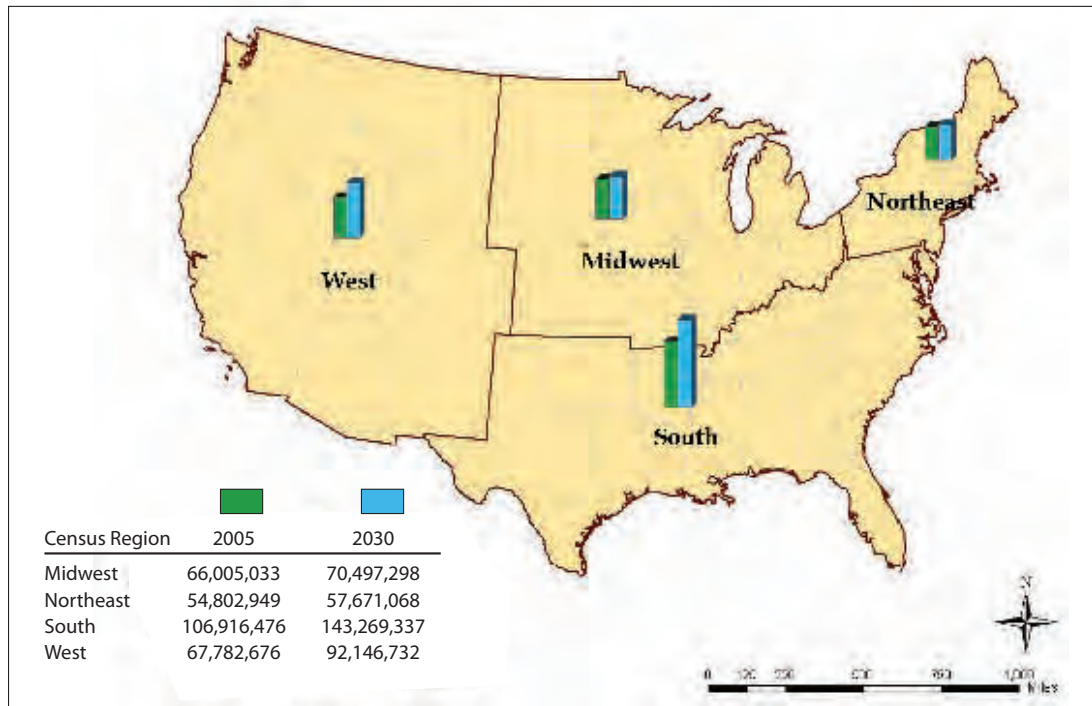


## Urban Areas Merge into Megaregions

As urban areas grow and blur they become megalopolises, annexing the surrounding counties and growing into each other's boundaries. Already, the Boston to Washington DC "Northeast Megaregion" is home to nearly 49 million. Growth in the West gives us a "Southern California Megaregion" topping 25 million, that runs from San Diego to Las Vegas and back to the Pacific where it nearly joins with the 10 million "Northern California Megaregion" of San Francisco to Sacramento to Fresno. Other megaregions comprise the entire state of Florida, Dallas-Austin-San Antonio, with its 11 million blurring into Houston New Orleans' 9 million. The "Piedmont Atlantic Megaregion" from Atlanta to Charlotte, North Carolina has a population of 15 million.

While these super areas seem to function as individual cities, they have multiple distinct centers and will require the infrastructure and capacity to serve not only each center, but center to center needs. They will require transit and roads that serve not only the original urban area, but the new urban area where housing and shopping and working are all centered in megaregions hundreds of miles across.

## Growth Projected in All Regions of United States by 2030



Accommodating metropolitan travel growth will be a challenge not just for local governments, but for the state departments of transportation who oversee urban Interstates that bear the brunt of metropolitan traffic. The solution lies in a combination of increasing highway, transit and passenger rail capacity, along with travel demand strategies.

### States Find Solutions

With population growth comes increasing travel demand. Fast-growing Nevada illustrates the challenges facing high-growth states. “We’re reaching 20-year population growth projections in five years,” said Susan Martinovitch, Director of the Nevada Department of Transportation. “We’re behind on capacity needs even when we’re opening up new facilities. So our focus right now is building to address the transportation needs of people who are already here.” She added, “During its peak growth period, 3,000 people a month moved into Las Vegas and Clark County, bringing 100 new cars per day to an already overworked highway system.”

In Utah, another fast-growing state, investments in capacity have “kept congestion at a manageable level,” said Utah DOT Executive Director John Njord. “By investing in new highway capacity in strategic areas since 1996, we have stayed ahead of the curve on congestion even with a rapidly growing population.” Njord said investments in transportation infrastructure are a key component of the state’s economic development strategy because, he said, “being able to move makes the state an attractive place for businesses to locate.”

## Nevada widening of U.S. 95



Nevada's largest state road project to date, the widening of U.S. 95 in northwest Las Vegas brought with it many advancements that will be used to enhance transportation throughout Nevada.

The improvements started in 2000 and were separated into 10 projects. One project, completed at the end of 2007, improved eight miles of U.S. 95, expanding the freeway and utilizing intelligent transportation systems such as ramp metering to improve traffic flow by controlling spacing of merging vehicles. The project also marks the state's first use of high occupancy vehicle (HOV) lanes to improve traffic flow. By allowing only vehicles with two or more passengers, HOV lanes can help mitigate ever-increasing traffic by encouraging carpooling. U.S. 95 is envisioned to be the start of a valley-wide HOV network

that will whisk carpoolers through I-15, I-515 and other Las Vegas corridors on dedicated HOV lanes. Now, more than \$500 million in total improvements have enhanced the busy section of freeway that sees over 200,000 vehicles daily.

## Utah adds freeways and transit

Between 1970 and 2000, Utah's population doubled from 1.1 million to 2.2 million. During the next 30 years, it is forecast to double again to 4.4 million. Through a community-based planning process called "Envision Utah," state and local governments, the business community and citizens groups have joined forces to weigh options for shaping their future. From this process emerged a plan for the region's transportation system that featured a combination of major highway and transit improvements.



### Utah's Legacy Parkway

By 2000, Interstate 15 between Salt Lake and Davis counties was one of Utah's most heavily traveled freeway corridors, operating at full capacity during rush hours, with average speeds as low as 30 mph. It was clear that an alternate route was needed. The \$685 million Legacy Parkway Project began construction in December 2006 as a 14-mile-stretch of four-lane highway to provide an alternate roadway for northern Utah commuters. The day the Parkway opened in September 2008, the average evening commute dropped to 14 minutes from the previous 44-minute average.

### Utah Transit Expansion of Service

Congress provided \$312 million to help the Salt Lake City region deliver light rail service in time for the 2002 Winter Olympics. In the years since then, the system has been steadily expanded to meet the needs of the greater Salt Lake City region: An extension to the University of Utah in 2001; service to the regional Medical Center in 2003; and in 2008 work began on four other light-rail extensions, including a connection to the Salt Lake International Airport, and commuter rail service. Today Utah transit's rail systems serve 60,000 passengers daily.



## Decades of Underinvestment

But even while population, freight and travel are on the rise, investment in transportation and capacity has been on the decline. The nation's investment in highway construction shows a steadily downward trend both as a percentage of our nation's wealth, and in relation to traffic.

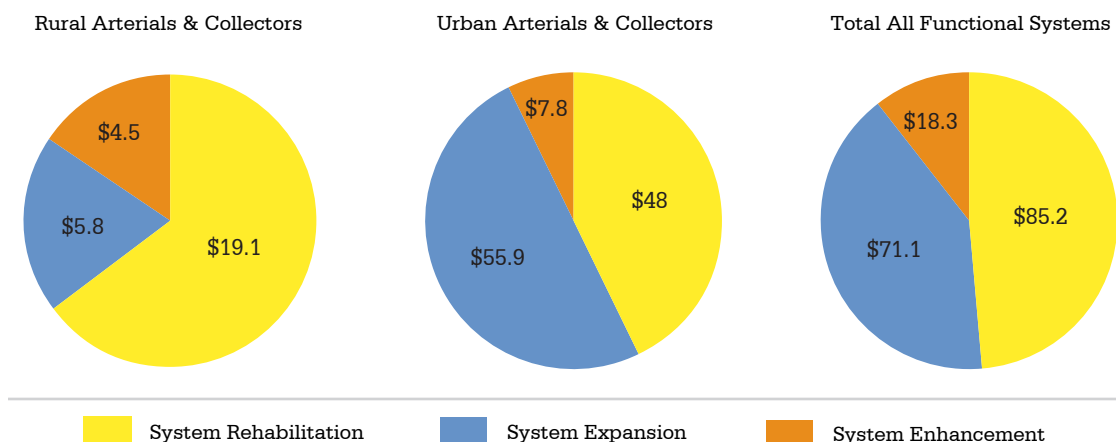
Capital Outlays for U.S. Highway Construction, 1960–2000				
	Billions of Current \$	Billions of Constant 1987 \$	Percentage of GDP	Outlays in 1987 \$ per million VMT
1960	6.3	27.3	2.2%	38
1970	11.6	33.2	2.3%	30
1980	20.3	23.2	1.6%	21
1990	35.2	32.4	1.5%	15
2000	61.3	44.3	1.8%	16

Jones, David W. *Mass Motorization and Mass Transit: An American History and Policy Analysis*. pp. 183. (c) 2010 David W. Jones, Jr. Reprinted with permission of Indiana University Press.

The National Surface Transportation Policy and Revenue Study Commission reported in January 2008, that the U.S. needs to invest at least \$225 billion annually for the next 50 years to upgrade the existing transportation network to a state of good repair and to build the more advanced facilities required to remain competitive. The nation currently is investing less than 40 percent of that amount today.

The U.S. Department of Transportation's *2008 Conditions and Performance* report projects an annual highway investment need of about \$175 billion. Of that amount, the DOT states that \$85.2 billion is needed annually for system rehabilitation, \$71.1 billion for system expansion and \$18.3 billion for system enhancements such as safety improvements.

## Annual Highway Capital Investments Needs (billions of 2006 dollars)



Source: U.S. DOT *Status of the Nation's Highways, Bridges and Transit, Conditions and Performance Report, 2008*





Washington is targeting I-5's worst chokepoints by building capacity, making highways more efficient with traffic technology, and giving commuters more choices.



## PART 2

# It Is Your Father's Interstate! But It Doesn't Have to Be

*“The Interstate System will never be finished because America will never be finished.”—Francis Turner, father of the Interstate Highway System*

Seen from a satellite, the U.S. is crisscrossed by a grid of 62 major superhighways, 27 running east and west, and 35 north and south. Another 244 spurs and beltways circle urban areas. Conceived of in the 1940s, a 41,000-mile Interstate System was approved by Congress in 1956. Built largely in the 60s and 70s, the system grew to 47,000 miles and launched the nation on an era of unparalleled economic growth.

As the nation celebrated the 50<sup>th</sup> anniversary of the launch of the Interstate Highway System in 2006, research began into what the next generation of the nation's hardest-working highways should be.

Foremost in terms of priority is preserving what we already have. All across America the Interstate system is showing its age and inability to meet today's travel demands.

- The Interstate Highway System has more than 55,000 bridges, many of which are reaching 40 to 50 years of age. Bridges and other structures of this age usually require substantial rehabilitation and some cases replacement.
- As the 210,000 lane miles of the Interstate System reach 40 to 50 years of life, major portions will need to have their foundations completely reconstructed.
- The Interstate System has almost 15,000 interchanges, many of which do not meet current operational standards and create bottlenecks or safety problems.

**Preservation must go hand-in-hand with highway safety and operational performance. Rehabilitation and capacity expansion are not separate activities, but aspects of a larger process of maintaining a transportation system in optimal performance.**



## What's So Great About an Interstate?

The Interstate Highway System is the workhorse of the nation's transportation system. In total, the 47,000-mile Interstate Highway System represents only one percent of total highway miles, but it carries 24 percent of all traffic, and 41 percent of combination-vehicle truck traffic. Although the heavily used Urban Interstate System represents only 32 percent of Interstate route miles, it carries 63 percent of Interstate traffic, some 460 billion vehicle miles annually.

In 2006, Americans traveled more than 258 billion vehicle miles on rural Interstates, 26.4 billion on small urban Interstates and more than 456 billion miles on urban Interstates. In the decade from 1997-2006, Interstate travel grew by an annual rate of about 2.3 percent, compared to 1.9 percent on all roads.

If you thought there were more big rigs on the road, you're right. Interstates increasingly function as a warehouse-on-the-move, carrying over \$11 trillion of goods to and from manufacturers, retailers, ports and consumers in 2008 alone.

From 1997-2006, combination-vehicle truck travel grew by 4 percent annually on urban Interstates and a half percent on rural Interstates. Combination trucks accounted for 17 percent of the travel on rural Interstates and 6.2 percent on urban Interstates.

## Urban Interstates are the New "Main Street"

Within a city's limits, there are no harder-working highways than the Interstates. What were once intended as high-speed national connectors have become, in fact, the new urban Main Streets. In many metro areas, the bulk of traffic is carried on urban Interstates and state arterials, rather than on city and county arterials or local streets. For example, 19 percent of the highway miles in the Houston metro area are Interstates and other state arterials, carrying 78 percent of the number of miles driven (VMT). In the Austin metro area, only seven percent of the highway network is made up of state arterials and Interstates, but those roads carry 80 percent of the traffic.

### Northern Virginia illustrates Interstate highway and transit expansion needs



Urban areas are struggling to maintain service levels on increasingly crowded transportation facilities. For example, the Washington, D.C., metropolitan area, which includes the Maryland and Virginia suburbs, is one of the top most-congested areas. In 1990, Northern Virginia had a combined population of 1.5 million. By 2030, its population is expected to grow to nearly 3 million.

Northern Virginia has become a dominant player in the Washington metropolitan region, producing 60 percent of recent job growth. Unfortunately, that job growth has led to the region consistently being rated in the top ten for congestion, even during the recent economic downturn. Truck and car traffic has strained highways and interchanges—leading to the need for massive investments to create a transportation system for the future.

## Woodrow Wilson Bridge



Ten years ago, any of the thousands of commuters stuck in daily traffic jams could have told you that the Woodrow Wilson Bridge on Interstate 95, just south of Washington, D.C., needed replacement. Fifty years ago it was designed to carry 75,000 vehicles a day across the Potomac River. By 2000 it was carrying 200,000 vehicles a day, and in 20 years it is expected to carry more than 300,000. The Virginia and Maryland DOTs joined forces to expand the bridge from six to 12 lanes, two of which will be used for transit or a regional HOV system. Approaches and interchanges north and south of the twin-span bridge will improve connections and traffic flow. The first span of the project was opened to traffic in 2006, and the second in 2008. Construction was completed on time and on budget.

Unclogging the Woodrow Wilson Bridge:

- Saves drivers and truckers 40 minutes a day; and
- Saves regular bridge commuters \$4,600 in time savings each year.

## Metrorail extension to Tysons Corner and Dulles Airport



Construction is underway on the Dulles Corridor Metrorail Project, a 23-mile extension of rail service connecting downtown Washington, D.C., Tysons Corner Center, Virginia's largest employment center, Washington Dulles International Airport and Loudoun County, one the fastest growing communities in the nation. The project will provide high-capacity transit service in the Dulles Corridor, resulting in a no-transfer trip from Dulles Airport to downtown Washington, offer a viable alternative to auto travel in this economic stronghold, and support mixed-use, transit-oriented development near the 11 Metrorail stations.

## HOT-Lane expansion of Virginia's portion of the Interstate 495 Capital Beltway

As business and residential developments have boomed in the suburbs surrounding the nation's capital, traffic has grown dramatically. Automotive, HOV and transit capacity would have to be added or congestion would stifle an otherwise thriving economy. In 2007, Virginia DOT announced a public-private partnership with the Fluor-Transurban Consortium to finance the expansion needed. Four High Occupancy Toll (HOT) Lanes will be added to 14 miles of the Capital Beltway, expanding the Interstate's capacity from eight to 12 lanes. Transit buses and high-occupancy vehicles will be allowed use of the lanes at no charge. Other drivers will be charged variable tolls based on the concept of "congestion pricing" to ensure free-flowing traffic conditions in the HOT lanes at all times.

## A Balanced Approach to Preservation and Expansion Investment

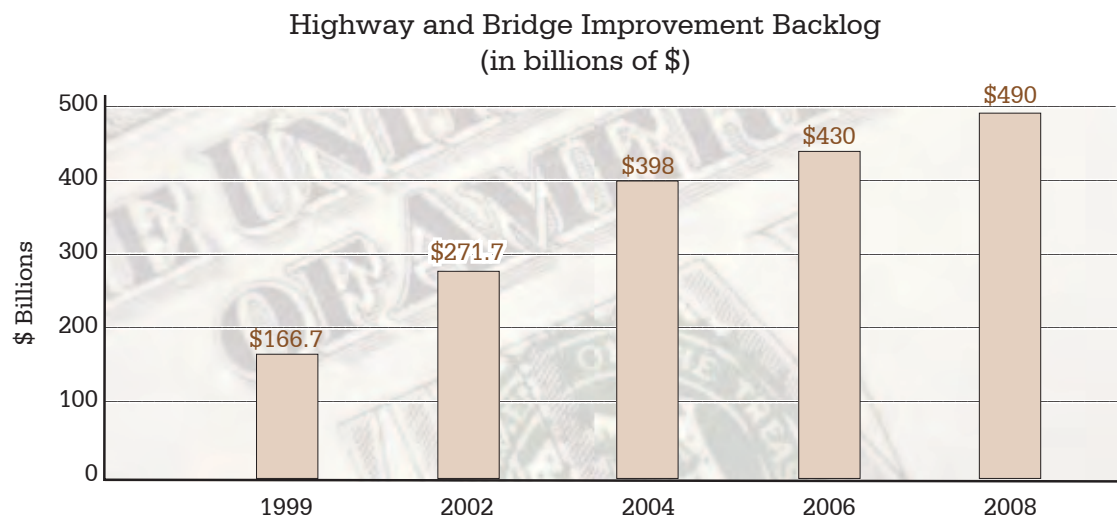
The most recent federal report that documents national highway and bridge capital investment needs is U.S. DOT's *2008 Conditions and Performance Report*. It recommended that to meet the future needs for condition and performance over the next 20 years, 48.7 percent of capital investment should go into system rehabilitation and 41 percent should go to system expansion. They recommended that 10.4 percent go to enhancements, which included safety, traffic operations, and environmental mitigation and enhancement.

The report recommended a balanced approach to investment, with significant emphasis on rehabilitation and expansion of the system. Recognizing future metropolitan mobility needs, the report recommended that 50 percent of funding be invested in expanding urban arterials and collectors.

## Addressing the Current Highway and Bridge Backlog

Two recent studies have addressed the backlog in highway and bridge investment needs. According to the U.S. DOT's *2008 Condition and Performance Report*, published in early 2010, years of underinvestment have resulted in a \$523.5 billion backlog of highway improvements and a \$99 billion backlog of bridge improvements that are needed to maintain the current condition and operational performance of the highway system.

AASHTO's *2009 Bottom Line Report for Highways and Transit* found that to bring the nation's highways and bridges up to a good state of repair would cost \$490 billion. As of 2008, 46 percent of the backlog was created by current capacity deficiencies.



The analysis by U.S. DOT and AASHTO addressed the levels of investment needed to bring both the **condition** and the **performance** of the system to an acceptable level. These dual goals are critical to keeping America moving. If most or all of our capital investments were made in system rehabilitation and little to none in adding needed capacity, the condition of the nation's roads and bridges would improve, but traffic would grind to a halt.



One of the policy positions being considered by the Congress is that no federal investment could be used to add highway capacity until the entire national highway system is brought up to a good state of repair. One advocacy group, has recommended that, "Congress should firewall these funds so they cannot be flexed into other spending areas without certification that existing infrastructure is in a state of good repair."

If the funds made available to the states, cities and counties for system rehabilitation were unlimited, or at least sufficient to bring the system to a good state of repair in one authorization cycle, that concept might make sense in states not expecting population or economic growth. But with many states, especially in the South and West expecting substantial growth and funding expected to fall short of what is needed, this proposal is nothing short of a prescription for certain "gridlock."

### **What Kind of Work Needs to be Done?**

Many interchanges built 40 years ago were designed before 53-foot-long, 18-wheel trucks dominated travel, and before traffic more than quadrupled. These facilities need to be replaced with interchanges that have wider lanes and geometric designs to allow higher volumes of cars and trucks to exit and merge more safely at higher speeds. While included in an Interstate rehabilitation project, this is a "capacity" increase.

Forty of the nation's chief state transportation engineers have concurred that "preservation must go hand-in-hand with highway safety and operational performance. Rehabilitation and capacity expansion are not separate activities, but aspects of a larger process of maintaining a transportation



Kansas has placed a high priority on reconstructing interchanges to eliminate bottlenecks.

**“Oregon’s rapid population growth has left our state’s highways straining to accommodate traffic volumes they were never designed to carry. As a trade-dependent state along the I-5 Trade Corridor, we rely on a strong transportation system to create jobs and move our products to market, and our clogged highways are increasingly imposing major costs on businesses and putting further strains on our economy. We’re doing our best to accommodate this growth in transportation demand through transit and other modes and improving the efficiency of the existing system, but it is clear that building a strong economy will require adding capacity to address highway bottlenecks.”**

—*Matthew L. Garrett,  
Oregon Department of  
Transportation Director*

system in optimal performance. Consideration of mobility and safety needs is inherent in the analysis of highway projects, and accommodating these needs concurrently leads to greater efficiency in the use of our limited federal funding.”

The Kansas Department of Transportation (KDOT), for example, is focusing particularly on reconstructing interchanges that were not designed for the traffic they are now carrying. “These aging interchanges have become major bottlenecks,” said KDOT Secretary Deb Miller. “The reality is we can add lanes to improve traffic flow, but it all comes down to reconstructing the interchanges to eliminate the bottlenecks.” Miller has estimated that it will cost \$1 billion to fix the bottlenecks in her state alone.

Delaware recently completed a major widening project along the busy I-95 corridor to keep pace with the constant traffic growth and major congestion. One four-mile stretch carried nearly 230,000 vehicles a day with no alternative routes for Interstate travel or construction detours. The project that widened this segment to five lanes in each direction cost \$89 million, and was completed in record time.

“With 230,000 vehicles traversing this stretch of highway every day, eliminating congestion is not just of local concern but also of national interest,” said U.S. Rep. Michael N. Castle (D-Del).

U.S. Senator Tom Carper (D-Del) said of the project, “Some might call it a miracle, but I know it is a combination of committed efforts on a state and federal level that completed this project in half the time and at under cost.”

As this reconstruction work goes forward, state DOTs will have to minimize disruption to the traveling public. Work zone delays are estimated to cause 24 percent of non-recurring congestion. As the infrastructure ages and more rehabilitation is needed, we must find better techniques to get the job done and more quickly. Examples of these include using components prefabricated off-site or longer-lasting materials, working at night, allowing short-term shutdowns for intensive work, and creating incentives that prompt contractors to finish work faster.

## Salt Lake City, Utah: Replacing a bridge in a weekend to minimize delay for the traveling public



Utah DOT decided that the 4500 South Bridge over Interstate 215 in Salt Lake City had deficiencies and needed to be replaced. A traditional process would have taken six to nine months to do the work and would have backed up traffic throughout that period. Instead UDOT used an innovative technique including a massive moving device on 256 wheels capable of moving a three-million-pound bridge into place. The contractor’s crews spent four months preparing the new bridge at the project site with minimal impacts to daily traffic. Then in late October 2007, workers demolished the old bridge and installed the new one in just 53 hours. I-215, which had closed Friday evening, was reopened Sunday evening before the start of the next workweek.









The I-670 Cap in Columbus, Ohio is one of the first retail projects built over a highway.

## PART 3

# The Opportunities of Expansion

## Safer, Smarter, More Sustainable

While the nation's expected growth in people, trade and travel alone would justify system expansion, capacity expansion projects also present opportunities for creating safer, smarter and more sustainable transportation.

### Safer

Because of their design, Interstates are already the safest highway system in the world. The lowest rate of deaths per 100 million miles of travel was reported on urban Interstates, at 0.55 percent in 2006. Rural Interstates also showed the lowest fatality rate in rural areas, at 1.1 deaths per 100 mil-

### *Moving Washington—The I-5 Reconstruction Project*



Interstate 5 is the lifeline for Washington State and its citizens, moving 250,000 freight, transit and passenger vehicles into and through Seattle each day.

I-5 is overwhelmed with traffic demand, experiencing up to nine hours of stop-and-go traffic each day. To meet increasing central Puget Sound transportation needs, WSDOT has focused on three strategies to improve traffic flow. Known together as *Moving Washington*, these strategies include building new road capacity where it makes the most sense, making highways more efficient at moving people and goods with new traffic technology and managing traffic demand by giving commuters more choices.

The state is targeting I-5's worst chokepoints by adding lanes, improving ramps and interchanges and making it easier for buses to get on and off the highway. Commuters, travelers and truck drivers could experience safer and smoother traffic conditions on a smarter highway that integrates traffic technology concepts such as variable speed limits, overhead lane status signs, ramp meters, real-time travel information signs, highway cameras and incident response trucks that quickly remove disabled vehicles. Using technology to make I-5 smarter improves safety and helps streamline traffic flow. Other projects to better manage traffic in I-5's highly-congested HOV and express lanes are also being considered.

lion miles of travel. Without an Interstate system, an estimated 6,000 people would lose their lives in traffic accidents each year.

States are constantly seeking ways to improve upon this safety record, implementing low-cost fixes such as rumble strips and median cable barriers. But system expansion provides the best opportunity to implement needed design improvements and application of “smart” technology.

Congestion, high accident rates and driver confusion led the Illinois Department of Transportation to make significant changes as it reconstructed the Dan Ryan Expressway in Chicago. By increasing the distance between ramps and creating a rail transit line in the median among other changes, the livability of the neighborhoods and safety of drivers, transit users and pedestrians were improved.

### I-15 Express Lane; Salt Lake City, Utah



Historically, the I-15 carpool or HOV lanes have been underutilized and average usage is less than half of the available capacity. By permitting single drivers to purchase that extra capacity, the travel times in the general-purpose lanes will decrease without increasing travel times in the Express Lanes or diminishing the value of carpooling.

The I-15 High Occupancy Toll (HOT) Lanes allow Single Occupant Vehicles (SOVs) to “buy” in to use the Express Lanes. The Express Lanes are separated from the general purpose lanes by a double white line buffer with skip-strip pavement markings indicating access points strategically located to correspond with entry/exit ramps along the corridor.

The goal of the I-15 Electronic Toll Collection (ETC) Project is to allow for enhanced management of the Express Lanes and to replace the current single price decal program with ETC System using a dynamic pricing model. This will allow UDOT to charge SOV users for each trip based on congestion instead of the unlimited monthly usage offered under the decal program.

### Smarter

States are using a variety of advanced technology, termed Intelligent Transportation Systems (ITS) to manage traffic, alert the public to road and travel conditions and even collect tolls. Capacity projects offer the ability to improve the operation of the highway system through such advanced technology.

Cleveland, Ohio's, Euclid Corridor Transportation project improved public transit access between the city's two largest employment centers, downtown Cleveland and University Circle. By creating more efficient transit service, the project improved access and increased pedestrian safety.

In Idaho, fiber-optic cables were installed along six miles of I-84 from the Garrity Interchange to the Meridian Interchange, along with five closed-circuit television cameras and vehicle detector stations at one-mile intervals as part of an overall transportation incident management plan.



## More Sustainable

Major urban Interstate projects have also afforded opportunities to revitalize communities and improve the environment.

Landscaping, sound barriers, improved stormwater facilities and new access for walkers and bicyclists are just some of the improvements being made as urban Interstates are rebuilt.

In Iowa for example, the reconstruction of the 14-mile Interstate 235 corridor through the heart of Des Moines included the replacement of 25 bridge crossings. Working with the local neighborhoods, the Iowa Department of Transportation developed a simple, contemporary design for the bridges and pedestrian fencing spans the freeway in a graceful, arching curve.

In Michigan, the Ambassador Gateway Project will remove long-distance commercial truck traffic from local neighborhood streets, reducing noise and emissions.



Courtesy of the Washington Nationals

The District of Columbia's Anacostia Waterfront Project combines efforts to improve safety, mobility and capacity in an area that serves 160,000 vehicles each day. Upgrades to roads and the South Capitol Street bridge adjacent to the new Washington Nationals' ballpark enhance the streetscape and pedestrian access. Further upriver, the 11<sup>th</sup> Street Corridor program will add new river bridges, a bicycle/pedestrian path and a streetcar line.

## Connecticut restores riverfront access in Hartford



When Interstate 91 was originally constructed, along with a railroad and flood control dikes, it became a significant barrier between Hartford and the Connecticut River. Once the city thrived because of its connection to the river, but after the Interstate was completed, the only awareness of the river's presence was from a glimpse from a bridge or high-rise building. Access to the river was virtually impossible. As time passed, the riverfront became a no-man's land, overgrown and neglected.

An agreement was reached in 1984 between ConnDOT, the Federal highway Administration, the City of Hartford and Riverfront Recapture, Inc., an organization committed to reuniting the city with the river. The agreement was that the project would include the lowering of an elevated portion of Inter-

state 91, the major obstacle to regaining access to the river, and construction of a pedestrian plaza over the highway airspace to the river's edge.

The location of the lowered Interstate and new Riverfront Plaza is at the location of the old steamboat dock at the foot of State Street, long since displaced by modern development. Spanning over 9 lanes of Interstate 91, the 1-1/2 acre plaza is a new landmark visible by a line-of-sight from the Old State House, drawing people toward the plaza's grand staircase and public elevator. The plaza has been built at the same elevation as Constitution Plaza, a series of elevated outdoor spaces along State Street that is now connected directly to the plaza.

## The Ohio DOT "Cap at Union Station" creates retail space



The Cap at Union Station is a \$7.8 million retail development constructed as part of a bridge that reconnects downtown Columbus, Ohio, with the burgeoning Short North arts and entertainment district. Opened in October 2004, the project effectively heals part of a 40-year transportation project that was created by the construction of the city's Interstate 670 inner-belt highway.

Composed of three separate bridges—one for through-traffic across the highway, and one on either side for the retail structures—the Cap provides 25,500 square feet of leasable space, transforming the lid over the freeway into a seamless urban streetscape with nine retail shops and restaurants. The I-670 Cap is one of the first retail projects built over a highway

in the United States. Other "lids" over Interstates include a park in San Diego over Interstate 15, which tied a residential neighborhood together, and another park in Mercer Island, Washington, which included several ball fields built over Interstate 90, just east of Seattle. *Photograph: Arnold Agency/copyright SNBA*

### **Columbia River Crossing to ease congestion, expand transit**

The I-5 Columbia River Crossing (CRC) is a project that will provide multi-modal solutions to the transportation challenges at the Interstate Bridge over the Columbia River between Portland, Oregon and Vancouver, Washington. The bridge and its approaches cause the worst traffic congestion in the Portland/Vancouver metro region, and form one of the biggest bottlenecks on the I-5 trade corridor, one of the nation's top freight routes. The northbound bridge was built in 1917 for Model Ts, and traffic has more than quadrupled since the southbound bridge opened in 1958. Today, with just three lanes in each direction, the bridges strain to carry 135,000 vehicles each weekday. Congestion on this crucial corridor lasts four to six hours each day, stalling motorists and buses in gridlock and delaying freight movement, including goods moving to and from the Port of Portland and Port of Vancouver, which are accessed from interchanges in the area. If no improvements are made, stop-and-go traffic is projected to increase to 15 hours a day by 2030 as the result of a rapidly growing regional population with few transportation options for travel between the two states.

The CRC will replace the obsolete Interstate Bridge—a lift structure that includes the only stop light on I-5 between Canada and Mexico—with a safer, more modern bridge that will include two auxiliary lanes in each direction to connect high-volume interchanges, thereby allowing traffic to merge and exit the freeway safely and efficiently. It will also extend Portland's light rail system into Vancouver and include a greatly improved bicycle/pedestrian crossing.

These improvements will significantly reduce congestion and safety problems while improving mobility, reliability, and accessibility, whether traveling by car, truck, transit, bicycle or on foot. The project will relieve a major freight and passenger bottleneck, eliminate a lift bridge, bring aging infrastructure up to a state of good repair, reduce the number of crashes on a dangerous section of freeway, enhance the region's economic competitiveness and significantly increase transit ridership—all while reducing greenhouse gas emissions and energy consumption compared to doing nothing.

### **Safety, access needs prompt Chattanooga Interstate Project**

Safety and congestion are both primary concerns for modernizing this section of I-124 in Chattanooga, Tennessee, which runs from north of I-24 to south of the Tennessee River Bridge. The Level of Service ranges from D to F and the crash rate is above the statewide average.

This highly traveled corridor is the gateway into Chattanooga's Downtown Business District. It is also the route that carries motorists to the city's major tourist attractions along the Riverfront, including the Tennessee Aquarium, AT&T Field, Finley Stadium and the Creative Discovery Museum, as well as to popular venues within the city's Art District.

The proposed improvements will add an additional lane to I-124 for a total of four lanes in each direction. The project will also either modify or completely redesign most interchanges along the corridor to improve traffic flow. Construction funding has not yet been identified for this project, which is estimated to cost approximately \$81 million.

### **Utah plans freeway, transit and trails for Mountain View Corridor**

The Mountain View Corridor is a new, planned freeway, transit and trail system in western Salt Lake and northwestern Utah counties, servicing 13 municipalities in the project area.

Initial construction will build two lanes in each direction with signalized intersections where future interchanges will be located. Future construction will build out the remainder of the corridor, including a transit solution and enhancement of the initial construction by adding interchanges and more lanes to achieve a fully functional freeway.

The project will be built in phases designed to balance transportation needs with available funds. The State of Utah allocated \$500 Million in the 2009 Legislative Session as part of a bonding package for start of construction.

The current funding allocated to this project is only a portion of the final cost.





As illustrated by this scene from Portland, a balance of transportation options will be needed to provide urban mobility.

## PART 4

# Urban Answers

## The Urban Mobility Challenge

On any overworked urban highway, throw in a rainy day, a fender bender, or even a short-term work zone, and slow-moving traffic gets even slower, costing millions in lost time and productivity.

During the last 20 years, the number of miles driven in urban areas has increased by about 80 percent while the number of new lane-miles only increased about four percent. As a result, in the nation's largest urban areas, congestion has doubled in the peak travel periods (three hours in the morning and three hours in the afternoon) during the last 25 years, from 32 percent to over 67 percent. In other words, two out of three drivers are sitting in traffic.

In large metropolitan areas like Los Angeles, San Francisco, Dallas-Fort Worth, and Washington, D.C., annual delays per driver routinely exceed 60 hours—more than an average work week—wasting an average of 48 gallons of gas per traveler.

During the next 30 years, the number of miles driven is expected to increase from 2.9 trillion in 2009 to approximately 4.5 trillion in 2050, assuming an annual growth rate of around one percent. The result: Our highways will be more crowded than ever, even with significant increases in the use of alternative modes of travel such as transit, biking and walking. Looking ahead, truck traffic alone is expected to more than double by 2050. Because more than 80 percent of the country's Gross Domestic Product (GDP) is generated in metropolitan areas, transportation investments in these areas must be a national priority.

## High-Tech Tracking Shows Congestion Returning to Major Cities

In the past year, the economic slowdown reduced travel, and consequently reduced the congestion that grips most metropolitan areas. In most recent reports, however, traffic congestion across the country is rising due to signs of economic recovery, initial rollouts of highway construction projects funded by federal stimulus packages, and lower fuel prices. In fact, 58 of the top 100 most populated metropolitan areas in the U.S. experienced increases in traffic congestion levels in 2009, according to the INRIX National Traffic Scorecard special report.

**To reduce current congestion and meet future needs, the study found that the equivalent of 30,000 additional lane-miles should be added to the existing 85,000 lane-miles of urban Interstate. Additionally, another 40,000 lane-miles need to be added to the existing urban segments of the National Highway System (major non-Interstate highways and freeways).**

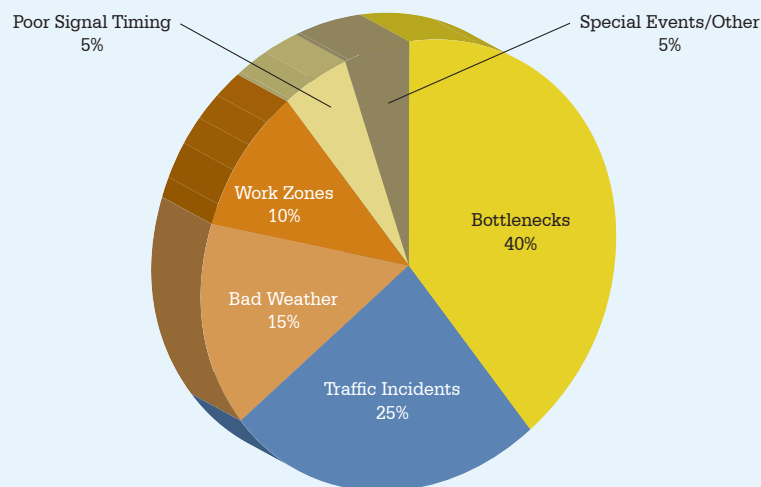
The annual INRIX Scorecard reports overall congestion and bottlenecks on America's major roadways, and is compiled using tens of billions of data points from more than one million GPS-enabled cars and trucks traveling across nearly one million miles of roads.

**According to the report, the top 10 most congested cities in 2009 were:**

1	Los Angeles, California
2	New York, New York
3	Chicago, Illinois
4	Washington, District of Columbia
5	Dallas, Texas
6	Houston, Texas
7	San Francisco, California
8	Boston, Massachusetts
9	Seattle, Washington
10	Philadelphia, Pennsylvania

For a complete ranking of the nation's most congested 100 metropolitan areas, see Appendix B or go to <http://scorecard.inrix.com/scorecard/Top100Metros.asp?sortby=5>.

### Sources of Traffic Congestion



Prepared for FHWA by Cambridge Systematics, Inc. with Texas Transportation Institute, July 2004



## What Causes Congestion?

- More vehicles than road capacity;
- Faster growth in population than in transportation options;
- Bottlenecks where commuters and freight traffic converge during peak travel times;
- Interchanges where exiting, entering, and lane changing cause traffic to slow down;
- Poorly timed traffic signals;
- Disruptions in traffic caused by crashes, bad weather, police activity, and special events such as sports or entertainment venues; and
- Few or no alternative transportation options.

## Urban Areas Continue to Be a Population Magnet

During the last 50 years, the number of people living in metropolitan areas in this country increased from 85 million to 225 million. During the next 40 years, this number is expected to grow to at least 335 million. Meeting the needs of America's growing urban areas requires a solution that preserves what has been built to date, improves system performance, adds needed capacity in highways, transit, and rail, and improves connections to ports and airports. It will also require approaches that go beyond transportation improvements to include policies addressing the economy, land use, housing, energy, and global climate change.

## A Four-Point Plan for Urban Mobility

### 1. Preserve and Modernize the Existing System

Preserving the transportation system built over the past century so that it lasts well into this century is a top priority. The Interstate System currently has approximately 210,000 lane-miles of pavement. As these pavement structures reach 40 to 50 years of life, the traditional approach of rehabilitation and resurfacing will no longer be sufficient. Major portions of the Interstate System must be completely reconstructed and expanded as needed. The Interstate System also has more than 55,000 bridges and tens of thousands of other significant structural elements, many of which are reaching 40 to 50 years of age. Bridges and other structures of this age usually require substantial rehabilitation, and as we look out another 20 to 30 years, many will require complete replacement. Preserving the Interstate system will clearly be a challenge.

No less important will be preserving the 115,000 miles on the remaining portion of the National Highway System, transit and rail systems, and the 3.8 million-mile network of state, city, county, and federal roads.

## Evaluating Congestion Solutions

You have heard, “**You can’t build your way out of congestion.**” Is that really true?

As part of a major federal transportation research effort, analysts are examining the impacts of applying different congestion reduction strategies to improve travel reliability.

Travel time reliability—how consistent travel conditions are from day-to-day—is a new concept in transportation system performance. It is important economically because travelers must build in extra time in their trips when dealing with an unreliable system.

The study examines congestion before and after highway improvement projects addressing:

- Bottleneck improvement;
- General capacity increases;
- Ramp meters;
- Freeway service patrol implementation;
- Aggressive incident clearance program; and
- HOT lane conversion.

According to the preliminary findings of the research “ALL forms of improvements—including capacity expansion” reduce congestion and improve reliability. The report finds, “All things being equal, more capacity (in relation to demand) means that the roadway is able to ‘absorb’ the effects of some events that would otherwise cause disruption.” In fact, it states that “a large part of the benefits of capacity expansion projects has been missed” in historical analysis.

In examining the impacts of congestion reduction strategies in major cities across the country, the report notes that capacity expansions have produced the largest improvement in travel times, ranging as high as 43 percent.

Demand management also can play a role in reducing congestion and improving reliability, researchers found.

Source: *Strategic Highway Research Program Project L03, Analytic Procedures for Determining the Impacts of Reliability Mitigation Strategies*

## The Interstate 87 Tappan Zee Bridge, New York, illustrates the preservation challenge



The Tappan Zee Bridge is one of the most strategic bridges on the Interstate Highway System, carrying regional traffic between metropolitan Westchester and Rockland counties, just north of New York City and the Northern New Jersey suburbs, as well as interregional traffic connecting the Mid-Atlantic states and New England. It is also the “poster child” of aging infrastructure in desperate need of replacement. Opened in 1955 at a cost of \$60 million, it carried 18,000 vehicles in daily traffic. By 2008, however, it was carrying more than 135,000 vehicles daily, and a state analysis that compared alternatives for rehabilitation and its replacement, showed that a replacement facility would need to handle daily traffic of up to 200,000 vehicles. New York now has to determine how to finance a project slated to cost as much as \$16 billion for the new

bridge, its highway approaches and the potential addition of a 30-mile, cross-corridor Bus Rapid Transit System, and a new 16-mile, West-of-Hudson commuter rail link across the river to Grand Central Terminal.

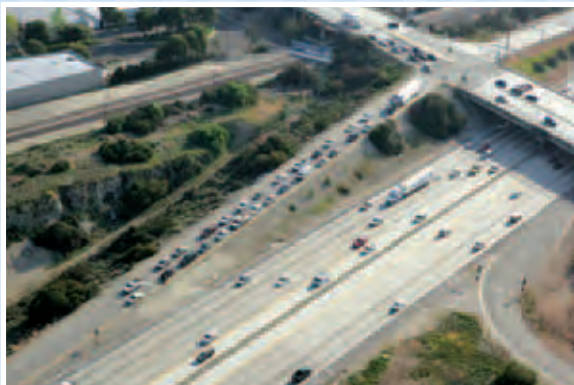
## 2. Improve System Performance

Applying the full range of intelligent transportation systems (ITS) and aggressive systems of operations and management strategies is also part of the solution to our capacity needs. Research has shown that while about half of congestion is due to inadequate capacity, the other half is due to non-recurring events such as storms, vehicle crashes, highway repairs, and major sports events. These congestion-causing incidents can best be addressed through better system management.

Ramp metering and roving freeway patrols are two examples of management solutions with a demonstrated track record. Protocols are being developed between state DOTs that manage highways, and police, fire and emergency medical services, and enable them to clear highway crash incidents in 30 minutes or less. Police agencies are agreeing to escort vehicles that have violated traffic laws off the nearest freeway exit so while a ticket is being written, flashing blue lights are out of sight and rubberneckers no longer slow down traffic. Cell-phone probe-based traffic information is growing in availability and may be used on a wider basis for system management purposes.

Some of the same advanced surveillance, detection and communications technologies supporting safety and mobility are also being employed to enhance homeland security, emergency evacuations in the event of natural disasters, and defense mobilization.

### California's use of advanced technologies to improve system performance



Caltrans recently invested \$20 million along the I-210 Corridor in eastern Los Angeles County to install ramp meters to reduce delays and increase freeway speeds. In the San Francisco Bay Area, the Metropolitan Transportation Commission (MTC) has invested \$57 million in developing its regional 511Travel Information System to provide better information to travelers and encourage mode shifts in response to traffic conditions.

Caltrans and MTC are investing \$92 million to implement Integrated Corridor Management along 16 miles of the heavily congested San Francisco Bay area I-80 Corridor. It will include strategies for active traffic management, such as ramp metering, travelers' information, and commercial vehicle operations to improve freight movement out of the Port of Oakland.

Expected benefits include increased vehicle throughput during peak hours, reduced congestion, decreased traffic accident response times, and reductions in air pollution.



### 3. Shift trips to other modes where possible

#### Public Transportation's Role

Public transportation, including buses, light rail, fixed rail or other common carriers, plays a vital role in efforts to mitigate traffic congestion, conserve fuel, enhance the efficiency of highway transportation, improve air quality, and reduce greenhouse gas emissions. In some of the nation's largest cities, public transportation carries a significant share of work trips destined for central business districts: Minneapolis, 12 percent; Seattle, 15 percent; Washington, D.C., 33 percent; and New York City, 53 percent. In 2008, 10.7 billion passenger trips were provided on the nation's public transportation systems, most of these in urban areas.

AASHTO supports increasing federal transit assistance by 89 percent in the next authorization to \$100 billion over six years, with a goal to double transit ridership by 2030, and double it again by 2050. To meet these goals, existing transit service must be expanded; where not yet available, transit service needs to be provided, as determined by states and their local partners.

Many states are adding transit options as part of Interstate rehabilitation and expansion projects, including commuter rail, dedicated bus lanes, carpooling and ridesharing.

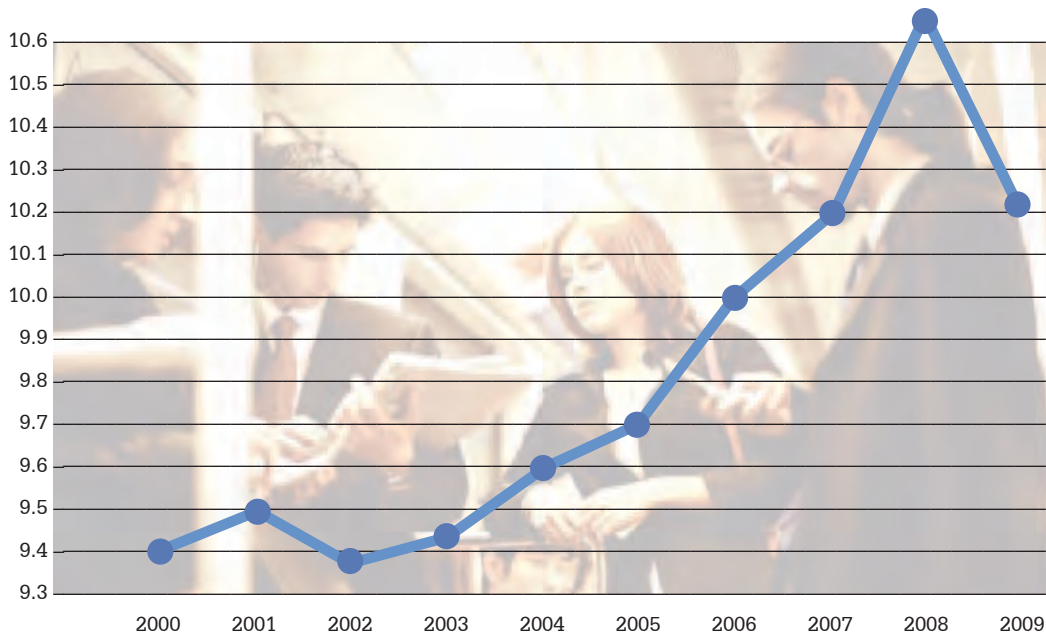


### Transit's share of overall travel

In 2007, the number of passenger miles traveled on America's public transportation systems reached 53.4 billion. Over the last decade, transit ridership rose from 9.4 billion in 2000 to 10.7 billion in 2008, and then declined by 3.8 percent in 2009 to 10.2 billion due to the economic downturn.\*

### U.S. Transit Ridership 2000–2009. Billions of Passenger Miles Traveled

(Includes heavy rail, light rail, commuter rail, trolleybus, bus, demand response, aerial tramway, automated guideway, cable car, ferryboat, inclined plane, monorail, and vanpool)



\* Source: American Public Transportation Association's *Public Transportation Ridership Report*.

According to *Commuting in America III*, the percentage of commuters traveling to work by transit dropped from 6 percent in 1980 to approximately 4.6 percent by 2000. If the United States can double transit ridership by 2030 as AASHTO has proposed, transit's share of commuters nationally can be restored to levels seen in 1980. If transit can double its ridership again by 2050, its share of commuters can increase still further.

Significantly increasing transit service will be an important component in ensuring affordable transportation and access to jobs and other services in communities all across America. Increased transit use can help reduce congestion as well as greenhouse gas emissions. Critical to improving metropolitan mobility, it will also become increasingly important to serve the rising number of older persons, especially in rural America. What our analysis shows, however, is that even massive investments in transit capacity and a quadrupling of transit ridership cannot substitute for additional increases in Interstate highway capacity needed to accommodate longer-distance passenger and freight movements and the through-trips that continue to grow.

### More bicycle and walking trips

Biking and walking are also part of the equation for future mobility. In the 2001 *National Household Travel Survey Summary of Travel Trends*, just under one percent of workers commuted by bike; another 2.8 percent walked to work. As metropolitan areas grow and options for greater pedestrian and bike use expand, these percentages are likely to increase as well.

AASHTO supports the continuation of the Transportation Enhancement Program, which supports new bike and pedestrian facilities. If the overall highway program is increased to \$375 billion as AASHTO has proposed, this should make available between \$500 million and \$1 billion each year for bicycle and pedestrian improvements funded through the Transportation Enhancement Program.

### Shift Freight from Trucks to Rail

Another piece of the congestion puzzle is shifting as much long-haul freight as possible to rail. Studies show that intermodal shipping by rail will grow at an annual rate of close to four percent over the next 25 years. Because of this, trucking's share of freight ton-miles is expected to drop from 62 percent to 59 percent during this time.

Even with this three percent shift from long-haul trucks to rail intermodal service, the *volume* of freight on our highways is expected to more than double by 2050. The percentage of tons carried by trucks overall is expected to increase from 73 percent today to 75 percent by 2050. The Interstates are the primary routes for these trucks—on average, every mile of the Interstate system sees 10,500 trucks a day. Given current rates of congestion in urban areas, more capacity must be a priority to keep the flow of goods and services moving while keeping costs in check for the American consumer.





### Shift Trips to Intercity Passenger Rail

Amtrak is the nation's intercity passenger rail operator, operating 300 trains and more than 78,000 passengers a day to 500 destinations in 46 states and the District of Columbia. In 2007, 5.8 billion passenger miles were carried by Intercity Passenger Rail. By 2008, 14 states had partnered with Amtrak and have spent millions of dollars to implement new service, improve on-time performance and improve safety and reliability.

Congress has recognized the critical importance of a robust and reliable intercity passenger rail system and enacted the Passenger Rail Investment and Improvement Act in 2008 to begin the planning process for such a system. In 2009, the American Recovery and Reinvestment Act (ARRA) included \$8 billion for intercity rail. High-speed rail and intercity passenger rail proposals in 31 states and the District of Columbia received grants to advance projects. Congress appropriated an additional \$2.5 billion for intercity passenger rail in FY 2010, and the President's FY 2011 Budget calls for spending an additional \$1 billion.

Through these measures, the U.S. is beginning to address the need for a healthy intercity passenger rail network comparable to world-class systems in other countries. AASHTO supports the provision of an additional \$50 billion in federal assistance over the next six years to fund intercity passenger rail projects.

Such initiatives can dramatically expand intercity passenger rail service and high-speed rail service in this country. This can help relieve pressure on aviation in busy markets like New York and Los An-

### California's High-Speed Rail Initiative shows how connections between Metropolitan Regions can be improved



On November 4, 2008, California voters approved a ballot measure to fund construction of the initial segment of the California High-Speed Rail network. The measure provided \$9 billion for the construction of the segment between San Francisco and Los Angeles/Anaheim, and an additional \$950 million for improvements to local rail systems, which will serve as feeder systems to the planned high-speed rail line. Financing plans include support from federal and local governments, as well as the private sector. Construction costs for the initial segment are projected to be in the range of \$40 billion. Securing a grant of \$2.3 billion in federal Economic Recovery funding set aside for intercity passenger rail has greatly advanced the prospects for this program to achieve success.

When the High-Speed Rail Authority was asked why building a high-speed rail network was so important to California's future, they responded as follows: "To serve the same number of travelers as the 220 mph high-speed rail system, California would have to build nearly 3,000 lane-miles of freeway plus five airport runways and 90 airport departure gates by 2020. Building the high-speed rail system proposed will cost half as much as these alternatives and at the same time increase mobility, while cutting air pollution and reducing the greenhouse gas emissions that cause global warming."

geles for intermediate travel distances of 200 to 400 miles. It can also help reduce highway travel in corridors such as the I-95 corridor on the East Coast, whether in Florida or in the Northeast Corridor, and the I-35 corridor from Texas to Minneapolis.

#### 4. Add the Highway Capacity Needed

##### Americans depend on highways for everyday travel

According to U.S. DOT's Bureau of Transportation Statistics in 2007, excluding aviation, Americans traveled more than five trillion miles on highways, in transit or on Amtrak as they went about their daily business. More than 95 percent of this travel, or 4.8 trillion passenger miles, was on our highways, either in cars, motorcycles, trucks or other vehicles.

Clearly, for most of us, highways are an integral part of our life, whether we live in major metropolitan areas, the suburbs or the country. But it's not just because highways carry cars—more than 73 percent of the freight moved in this country by tonnage, and 93 percent by value, moves by truck, including the Interstates, major roads and city streets. As the American Trucking Association has stated, "If you got it, a truck brought it."

How much capacity will be needed to unlock the gridlock of congestion, connect underserved areas of the nation and keep our economic engine working?

#### The Eisenhower Expressway offers a good example of what is needed



The Eisenhower Expressway is a key link in the transportation network serving northeast Illinois. Designed in the late 1940s, built and opened to traffic in the 1950s, the roadway was the first expressway in the United States to incorporate a rail transit line in the median with rapid transit sharing the right-of-way.

The Eisenhower Expressway was originally designed to accommodate approximately 100,000 vehicles per day. Today, it carries close to 200,000 vehicles on six lanes. Motorists experience stop-and-go traffic for 14 of 24 hours on an average day. An average of 3.5 crashes takes place each day. Resurfacing has maintained the condition of the Eisenhower Expressway over time; however, the pavement base is past the end of its 40-year design service life.

Reconstruction of the Eisenhower Expressway, including the expansion of its current capacity, is clearly needed, but due to funding and planning constraints, has not yet been scheduled by the Illinois Department of Transportation.

At the same time that the region is struggling to find the resources to fund expressway projects like the Eisenhower, it is also trying to fund critical freight rail projects like the \$1.5 billion Create Project. This project is planned to connect the railroads of the Western United States with the railroads of the Eastern United States through a series of rail bridges that will separate freight rail from regional passenger rail service, and eliminate the necessity of transferring cargo across town using thousands of trucks.

## Urban Interstate Needs

Metropolitan areas will continue to be the center of population and economic growth in the United States. During the past 50 years, the number of people living in metropolitan areas increased from 85 million to 225 million. During the next 40 years, this number is expected to grow to nearly 335 million.

The AASHTO 2007 *Future Options for Interstate Highways* study illustrates the kind of capacity increases that will be needed in urban areas across the nation during the next four decades. To reduce current congestion and meet future needs, the study found that the equivalent of 30,000 additional lane-miles should be added to the existing 85,000 lane-miles of urban Interstate. Additionally, another 40,000 lane-miles need to be added to the existing urban segments of the National Highway System (major non-Interstate highways and freeways).

AASHTO has recommended that funding for the overall highway program be increased to \$375 billion over the next six years, including funding for preservation and to meet rural needs. A significant portion of these funds should be provided to build needed highway capacity. These dollars should be systematically programmed by states and metropolitan planning organizations to meet community needs, especially the needs for increasing metropolitan mobility and reducing congestion.

**Future Analysis.** The 2007 *Future Options for Interstate Highways* study has provided a perspective on the capacity needs of the 47,000-mile Interstate System. AASHTO's authorization proposal has called on Congress to fund a study by U.S. DOT and the states of the future preservation and expansion needs of the 162,000-mile National Highway System (NHS), which includes the Interstates. NHS routes constitute 4 percent of total highway mileage, but carry 40 percent of all traffic and 70 percent of combination vehicle truck traffic.

For more information and for detailed examples by state of needed capacity on both the National Highway System and the Interstates, go to <http://ExpandingCapacity.transportation.org>.

More information on AASHTO's authorization programs can be found at <http://AreWeThereYet.transportation.org>.



The capacity projects identified by the states are essential to rebuild the economy, keep pace with growth and keep a competitive edge in worldwide trade.



## APPENDIX A

# Urgent Capacity Needs

## Key Examples of Capacity Needs Across America:

Find Your State at <http://ExpandingCapacity.transportation.org>

Whether it's a traffic-choked interchange or a out-dated bridge inadequate to accommodate today's traffic, states have a long and **urgent list of capacity improvement projects**. In response to an AASHTO survey, state departments of transportation have identified some of their high priority needs, listed below. Full details on these projects are available at <http://ExpandingCapacity.transportation.org>.

### Alabama

- Alabama Statewide Transportation Plan—Congested Roadways

### Arizona

- Roosevelt Street to Santan Freeway (SR 202L)
- Santan Freeway (SR 202L) to Riggs Road
- Papago Freeway (I-10); Agua Fria Freeway (SR 101L) to Interstate 17
- Agua Fria Freeway (SR 101L); Interstate 10 to Interstate 17
- Pima Freeway (SR 101L); Interstate 17 to Tatum Boulevard
- Pima Freeway (SR 101L); Shea Boulevard to SR 202L (Red Mountain)
- Santan Freeway (SR 202L); Interstate 10 to Gilbert Road
- Red Mountain Freeway (SR 202L) Westbound; Scottsdale Road to Interstate 10
- South Mountain Freeway (SR 202L); Interstate 10 (East) to Interstate 10 (West)
- Interstate 10: Val Vista Road to Junction Interstate
- Interstate 10: I-8 to SR87
- I-10; Picacho Peak to Town of Picacho
- I-10; Prince Road to Ruthrauff Road
- SR77; Calle Concordia to Tangerine

### Arkansas

- I-430/I-630 Interchange—Little Rock
- Interstate 540 in Northwest Arkansas

### California

- Complete I-905 Freeway

### Colorado

- 2035 Statewide Transportation Plan—Congested State Highways
- I-70, Denver Metropolitan Area

### Connecticut

- I-84, Aetna Viaduct

### Delaware

- US 301, Delaware
- I-95 Newark Toll Facility

### District of Columbia

- Anacostia Waterfront Program

### Florida

- I-275 Links—Tampa
- I-4—Orlando

### Georgia

- I-75 North from approximately I-285 to Hickory Grove Road in Cobb County

- I-85N HOV to HOT conversion from I-285 to Old Peachtree Road in Gwinnett County
- Conversion of HOV lanes along I-75/I-85 within the I-285 perimeter to HOT Lanes

### Hawaii

- Route 92—Nimitz Highway Viaduct, H-1 Interstate to Honolulu Downtown
- Interstate Route H-1 Widening, Middle Street to Vineyard Boulevard
- Lahaina Bypass, Launiupoko to Honokowai

### Idaho

- U.S. 95, Garwood to Sagle Expansion
- Expansion of Port of Lewiston Dock and Idaho 128 Expansion
- U.S. 95, Thorncreek Road to Moscow, Stage 1 Expansion
- Meridian Interchange Replacement
- Idaho 75, Timmerman to Ketchum Expansion
- I-84/U.S. 93 Interchange, Stage 2 Expansion
- U.S. 30, Lava Hot Springs to Fish Creek Expansion
- U.S. 20 at I-15 Reconstruction
- I-84 Central Treasure Valley Gap Closure Project

**Illinois**

- Congestion mitigation or system expansion projects throughout Illinois
- I-290 Phase I Study

**Iowa**

- I-80/I-380/U.S. 218 Interchange—Coralville, Iowa
- Council Bluffs Interstate Project
- Interstate 29/Sioux City Iowa Reconstruction Project

**Kansas**

- 70 Interchange with Kansas Highway 7 (Kansas Turnpike Exit 224) Near Kansas City

**Kentucky**

- Kennedy Interchange, Louisville

**Louisiana**

- I-10 Williams Blvd.—Causeway (Jefferson Parish)
- LA 1 Improvements, Phase II
- I-10 Bridge and Approaches Over Calcasieu River
- I-49 North
- LA 616 (Arkansas Road) in Ouachita Parish
- I-49 Connector (Lafayette)
- US 190 in St. Tammany Parish

**Maine**

- Interstate 295: South Portland to Brunswick, Maine

**Maryland**

- I-695
- I-270 Integrated Corridor Management (ICM)

**Massachusetts**

- I-95/I-93 Interchange—Reading/Stoneham/Woburn, Massachusetts
- I-93 Widening from Just North of Route 125 to the New Hampshire State Line, and Associated Interchange Improvements

**Michigan**

- Detroit River International Crossing
- Blue Water Bridge Plaza
- Detroit Intermodal Freight Terminal
- M-1 Rail Project
- Ann Arbor—Detroit Commuter Rail Project
- Washtenaw Livingston Commuter Rail Line Project
- I-94, I-96 to Conner, Detroit, Michigan

**Minnesota**

- TH 610 from Hennepin CSAH 81 to Interstate 94
- Interstate 94
- Interstate 494 @ TH 169

**Mississippi**

- I-55 and I-20

**Missouri**

- Reconstruct 200 Miles of I-70
- I-70 Improvements in the Kansas City Metropolitan Area
- I-470 Improvements from US 50/MO 350 to I-70
- I-70 and I-435 Interchange
- US 71 Improvements from 155th Street to North Cass Parkway
- I-29 from 210 to US 169
- MO 210 from Eldon Road to MO 291
- Downtown Loop, Kansas City
- Missouri Highway 5
- US Highway 50
- US Highway 50/63 (Rex Whitton Expressway)
- Daniel Boone Bridge
- Hall Street Improvements
- I-270 Operational Improvements from Rte. 100—Rte. 30
- I-270 Improvements from McDonnell Blvd to the Chain of Rocks Bridge
- I-44 Reconstruction from St. Louis City Limits to I-55
- Improvements to I-44/MO Rte. 141 Interchange
- Improvements to I-55 in Southern Jefferson County
- Route 364, St. Charles County (Page Avenue)
- Poplar Street Bridge and Ramp Improvements
- Interstate 49 from Kansas City to Arkansas
- US 60/MO 37 Corridor in Southwest Missouri
- Joplin West Corridor
- Reconstruct US 60
- US 65 Expansion

**Nebraska**

- I-80 56th Street to Waverly Project
- NE 370 Gretna East Project

**Nevada**

- Widening of U.S. 95
- I-15 Resort Corridor Study
- I-15 South Design-Build Project

**New Hampshire**

- I-93, Between Bow and Concord
- NH 16, Conway

- I-93, Between Derry and Londonderry
- St. Lawrence and Atlantic Railroad, from Vermont/New Hampshire border to Berlin, New Hampshire
- I-93 Improvements, New Hampshire/Massachusetts Stateline in Salem and continuing north to the I-93/I-293 junction in Manchester

**New Jersey**

- Route 295 & 42/I-76 Direct Connection, Camden County

**New Mexico**

- Interstate 25 and NM 423 (Paseo Del Norte) Interchange Reconstruction

**New York**

- Tappan Zee Bridge/I-287 Multi-Modal Corridor—Suffern to Port Chester
- Staten Island Expressway HOV Lane—Richmond County

**North Carolina**

- I-85 Widening Project in the Cabarrus-Rowan MPO

**North Dakota**

- I-94, Fargo/West Fargo

**Ohio**

- Brent Spence Bridge Replacement/Rehabilitation Project, Hamilton County, Oregon

**Oklahoma**

- I-44 Corridor in Tulsa—Arkansas River East to Yale Avenue
- I-44 in East Tulsa—Extending from I-244 East to SH-66
- I-235/I-44 interchange in Oklahoma City

**Oregon**

- I-5 Columbia River Crossing

**Pennsylvania**

- I-81—From the Maryland line to intersection with I-78
- Interstate 95—Metro Philadelphia sector
- Interstate 83—Between I-81 and the Eisenhower Interchange

**Puerto Rico**

- STAR, a regional multi-modal transportation initiative



**Rhode Island**

- Route 6/Route 10 Interchange—Providence
- I-95/Route 4 Interchange—East Greenwich, Warwick, and West Warwick
- I-95 Between Route 6/10 and Route 146 Interchanges—Providence

**South Carolina**

- Interstate 20, Richland County
- Port Access Road, North Charleston

**Tennessee**

- New Bridge over Mississippi River at Memphis, Tennessee/Arkansas/Mississippi
- Capacity Improvement—Interstate 40 (Wilson County, TN) from Mt. Juliet Road (Exit 226) to SR-840 (Exit 235)
- I-124—Regional Strategic Corridor—from north of I-24 to south of Tennessee River Bridge

**Texas**

- US 290 Corridor

**Utah**

- Mountain View Corridor
- Interstate 15
- I-15 Mile Post 0 to 13; St. George, Utah

**Vermont**

- The Morrisville Bypass

**Virginia**

- I 95/395 HOT Lanes
- Downtown Tunnel, Midtown Tunnel, and Martin Luther King Freeway Extension

**Washington**

- I-5 Reconstruction Projects

**West Virginia**

- WV 705 Connector—Morgantown, Monongalia County
- East Beckley Bypass—Beckley, Raleigh County
- I-64—Cabell, Putnam and Kanawha Counties
- Dick Henderson Bridge Replacement—Nitro/St Albans, Kanawha County
- I-79—Marion and Monongalia Counties
- WV 2—Wood, Pleasants, Tyler, Wetzel, Marshall, Ohio, Hancock and Brooke Counties
- WV 10—Logan County

**Wisconsin**

- I-94 at the Badger Interchange, Dane County

**Wyoming**

- Interstate 80 Truck Climbing Lanes

## Appendix B: 100 Largest Metro Areas Ranked by Overall Congestion January–June 2009

1	Los Angeles-Long Beach-Santa Ana CA	51	Memphis TN-MS-AR
2	New York-Northern New Jersey-Long Island NY-NJ-PA	52	Little Rock-North Little Rock-Conway AR
3	Chicago-Joliet-Naperville IL-IN-WI	53	Omaha-Council Bluffs NE-IA
4	Washington-Arlington-Alexandria DC-VA-MD-WV	54	Albuquerque NM
5	Dallas-Fort Worth-Arlington TX	55	Columbus OH
6	Houston-Sugar Land-Baytown TX	56	Poughkeepsie-Newburgh-Middletown NY
7	San Francisco-Oakland-Fremont CA	57	Allentown-Bethlehem-Easton PA-NJ
8	Boston-Cambridge-Quincy MA-NH	58	Buffalo-Niagara Falls NY
9	Seattle-Tacoma-Bellevue WA	59	Scranton--Wilkes-Barre PA
10	Philadelphia-Camden-Wilmington PA-NJ-DE-MD	60	Harrisburg-Carlisle PA
11	Atlanta-Sandy Springs-Marietta GA	61	Raleigh-Cary NC
12	Minneapolis-St. Paul-Bloomington MN-WI	62	Rochester NY
13	Miami-Fort Lauderdale-Pompano Beach FL	63	Oxnard-Thousand Oaks-Ventura CA
14	Phoenix-Mesa-Glendale AZ	64	Madison WI
15	Denver-Aurora-Broomfield CO	65	Wichita KS
16	Baltimore-Towson MD	66	Richmond VA
17	San Diego-Carlsbad-San Marcos CA	67	Chattanooga TN-GA
18	Riverside-San Bernardino-Ontario CA	68	Worcester MA
19	San Jose-Sunnyvale-Santa Clara CA	69	Charleston-North Charleston-Summerville SC
20	Sacramento-Arden-Arcade-Roseville CA	70	El Paso TX
21	St. Louis MO-IL	71	Provo-Orem UT
22	Portland-Vancouver-Hillsboro OR-WA	72	Bakersfield-Delano CA
23	Austin-Round Rock-San Marcos TX	73	Albany-Schenectady-Troy NY
24	Pittsburgh PA	74	Columbia SC
25	San Antonio-New Braunfels TX	75	Fresno CA
26	Bridgeport-Stamford-Norwalk CT	76	Syracuse NY
27	Detroit-Warren-Livonia MI	77	Grand Rapids-Wyoming MI
28	Kansas City MO-KS	78	Des Moines-West Des Moines IA
29	Tampa-St. Petersburg-Clearwater FL	79	Stockton CA
30	Las Vegas-Paradise NV	80	Jackson MS
31	Virginia Beach-Norfolk-Newport News VA-NC	81	Springfield MA
32	Birmingham-Hoover AL	82	Dayton OH
33	Cincinnati-Middletown OH-KY-IN	83	Boise City-Nampa ID
34	Nashville-Davidson--Murfreesboro--Franklin TN	84	Tucson AZ
35	Baton Rouge LA	85	Greenville-Mauldin-Easley SC
36	Louisville/Jefferson County KY-IN	86	Youngstown-Warren-Boardman OH-PA
37	Cleveland-Elyria-Mentor OH	87	Portland-South Portland-Biddeford ME
38	Honolulu HI	88	Colorado Springs CO
39	Orlando-Kissimmee-Sanford FL	89	Augusta-Richmond County GA-SC
40	Oklahoma City OK	90	Akron OH
41	New Orleans-Metairie-Kenner LA	91	Greensboro-High Point NC
42	Milwaukee-Waukesha-West Allis WI	92	Knoxville TN
43	New Haven-Milford CT	93	Ogden-Clearfield UT
44	Charlotte-Gastonia-Rock Hill NC-SC	94	Palm Bay-Melbourne-Titusville FL
45	Hartford-West Hartford-East Hartford CT	95	McAllen-Edinburg-Mission TX
46	Salt Lake City UT	96	North Port-Bradenton-Sarasota FL
47	Providence-New Bedford-Fall River RI-MA	97	Toledo OH
48	Indianapolis-Carmel IN	98	Modesto CA
49	Jacksonville FL	99	Lakeland-Winter Haven FL
50	Tulsa OK	100	Cape Coral-Fort Myers FL

Source: *INRIX National Traffic Scorecard*. <http://scorecard.inrix.com/scorecard/Top100Metros.asp> as defined by Core-Based Statistical Area, OMB.





Publication Code: RP-UGCR-1  
ISBN: 978-1-56051-483-1



<http://ExpandingCapacity.transportation.org>



AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
444 North Capitol Street NW, Suite 249, Washington DC 20001. (202) 624-5800