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Rights-of-Way Management

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UPROW Committee

Index

1. INTRODUCTION

The management of Public Rights-of Way is a subject of complex interrelationships involving all levels of government as well as the private sector. It involves planning, technical engineering, construction, operations and maintenance issues. A mosaic of professional and specialized disciplines, regulators, manufacturers, material suppliers, financial investors, consultants and contractors all play a pivotal role in the building and management of rights-of-way and the associated infrastructure systems that they contains.

1.1. Purpose of Report

This report was developed to provide insight into the vast array of interactions and requirements that are necessary to regulate, operate, coordinate and maintain rights-of-way. This summary of origin, uses, governing authorities and responsibilities is provided for identification of technology-based applications that can help coordinate, communicate and collaborate between entities in a seamless, cost-effective and value added manner. This document also provides information and insight for those who will help to build advanced applications and solutions, but are not involved with right-of-way issues or activities.

1.2. Scope

This document has been prepared to bring together information from published sources, experience, and interviews, identifying many of the aspects concerning the management of public rights of way. An attempt to provide the source of the information has been made. In researching the information for this report, it became apparent that there are many variations in methods, rules, regulations and statistics and on how activities are performed. These variations are a reflection of the complexity and diversity of this subject.

1.3. Defining Right-of-Way

The dictionary provides a definition of *right-of-way* as (**1.** The right to pass across the lands of another; (**2.** land, property, or interest therein, usually in a strip, acquired for or devoted to build facilities such as roads, railroads, or utility facilities.

The definition used within this document relates to the land and facilities that are maintained and regulated as public rights-of-way and used for direct and indirect services that they provide, such as the mobility of people and products; water supply and wastewater treatment; energy and communication systems. There are many other types of facilities and users of the public rights-of-way and they can be publicly or privately owned.

1.3.1. Private Right-of-Way

A private right-of-way is normally acquired using a variety of conveyances to establish land usage rights such as fee simple estate or an easement. Pipeline, long distance communications and electric distribution companies have private right-of-ways for many of their facilities.

1.3.2. Public Right-of-Way

Public corridors or strips of land known as public rights-of-way (PROW) are normally acquired and

developed by public agencies. The right to obtain and use land for public benefit is of ancient origin. This right is not only a long-standing tradition but is provided for by law.

2. Origin of Rights-of-Way

2.1 Oldest Example of Rights-of-Way

Historians believe that the Royal Road[i], rebuilt in 456 B.C. to be the oldest road recorded in history and provided the earliest example of government build projects requiring land and rights-of-way. The history of this road can be traced back to 4500 B.C[ii], connecting the Persian Gulf and the Mediterranean Sea.

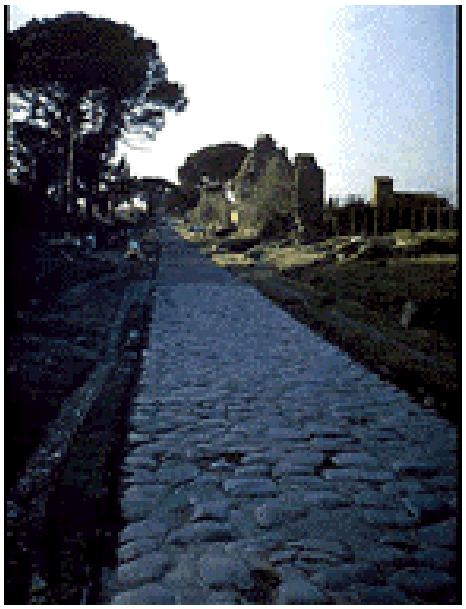
The king of Assyria is said to have issued instructions that if any person encroached upon the 78-foot wide rights-of-way, his head should be impaled on a pole erected in front of the palace.

Archeological excavations in India and Egypt show parallel road building projects during this same era.

2.2 Predecessor to Modern Rights-of-Way

Later, another road network the "Via Militares" became one of the basic reasons for the success of the Roman Empire. This predecessor of the modern freeway system was comprised of 29 different roads and covered 53,000 miles.

The most famous of the Roman roads, the Appian Way, was built in 312 B.C and its total length was more than 350 miles. This rights-of-way consisted of two center lanes of 15 ½ feet, with two-foot wide, 18-inch high curbs (or sidewalks), bordered on each side by a one-way road of 7 ¾ feet. The paving techniques used on the Via Militares were used as standard road construction procedures until the eighteenth century (about 2,000 years). This substantial construction of cemented stone blocks has preserved this roadway to the present.



Appian Way
(Built 321 B.C.)

From 752 A.D to 1070 A.D. the Toltecs[1] in central Mexico built a network of roads, which were later taken over by the Aztecs. This road system became the basis for the development of the Aztecs' advanced society. During this same period the Mayas were connecting parts of their nation with 25-foot rights-of-way called "White Ways" because of their surface coating of cement, line, and white clay. Between 1100 A.D. and 1532 A.D., heavy stones topped with bituminous cement covered over 2,000 miles of a 20-foot wide road that was built through the rugged Andes Mountains.

The first European road map was issued in the year 1500 and 100 years later England enacted the first Turnpike Act. The first engineering school established in Europe (Paris, 1747) made possible the surge of canal construction and road building involving the first new technology in paving since the Roman Empire.

One of America's famous rights-of-way is the Boston Post Road between New York City and Boston. Another would be the Lancaster Pike, which was the first extensive, hard surfaced road in the United States. Rights-of-way in the U.S. developed in two other fashions by the building of canal ways and railroads.

Property used as rights-of-way is of ancient origin and is still in use today and will be far into the foreseeable future. Many of the philosophies and practices of these ancient times are the basis for the laws and regulations that govern control over public rights-of-way today.

[1] **Toltec** *Pronounced As*: **toltek** , ancient civilization of Mexico. The name in Nahuatl means, master builders.

3. U.S. Public Rights-of-Way

While there are extensive property rights and rights-of-way held for public use such as parks and open space, the primary use and the key tenet of this report is the use of road rights-of-way.

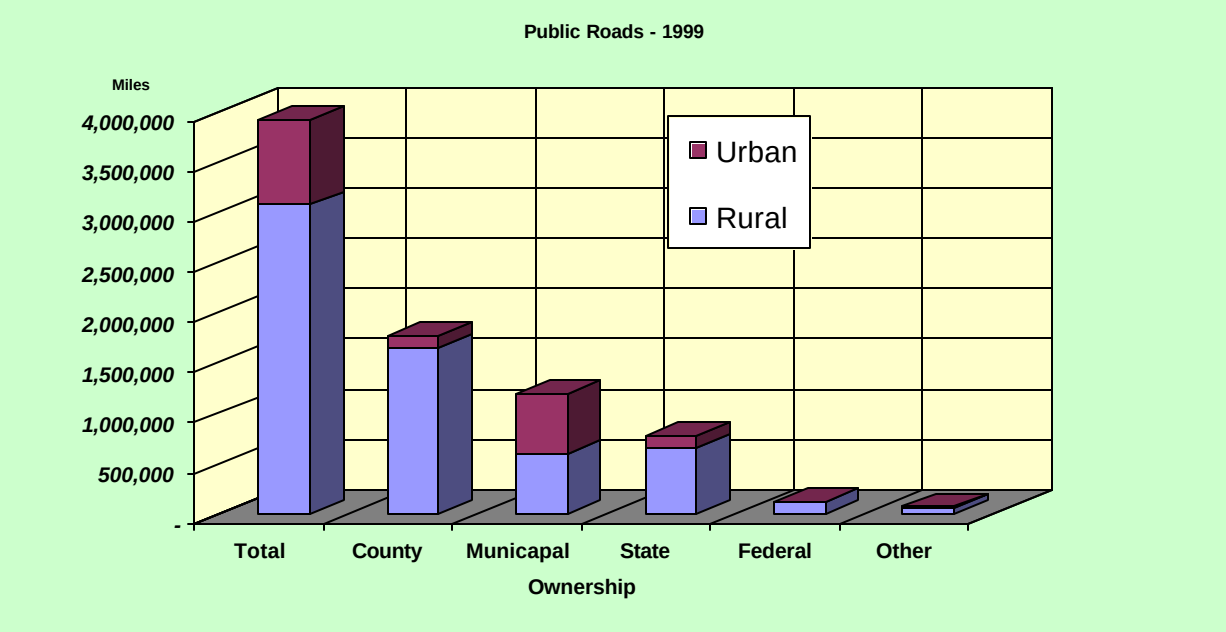
The United States road network is the largest and most complex system in the world. This network handles 4 trillion passenger-miles[1] and trillions of ton-miles of freight each year. This system is a key element in the U.S. economy and provides mobility for a diverse country of 275 million people living in thousands of cities and towns and working at more than 7 million business establishments.

Transportation Infrastructure of the Nation

Mode		**Component**
Road Network	46,036	Miles of Interstate Highway
	112,467	Miles of Other National Highway System Roads
	3,760,947	Miles 0f Other Roads

3.1 Public Roads

The U.S. Department of Transportation categorizes the Nation's roadways by urban and rural and by road function. Design standards are tied to function class and each class has allowable lane widths, shoulder width, curve radii, etc. Ownership miles are also another way to categorize public roads within the country. In the year1999, municipal and county governments owned and operated 76% of the nations public roads.



[1] (

3.2 Use of Public Rights-of-Way

For more than 100 years it has been recognized that it is in the public interest for utility facilities to use the rights-of-way of public roads and streets when such use and occupancy does not interfere with the primary purpose of the road. Joint use of the right-of-ways avoids the additional cost of acquiring separate rights- of-way for the exclusive accommodation of utilities. Local roads, streets and highways have long been used to provide public services to abutting residents as well as to serve conventional roadway needs such as street and signal lighting. Because many times the utilities in the right-of-way are not owned or operated directly by state or local highway agencies, these authorities have developed policies and practices to govern when and how the public right-of-ways are used.

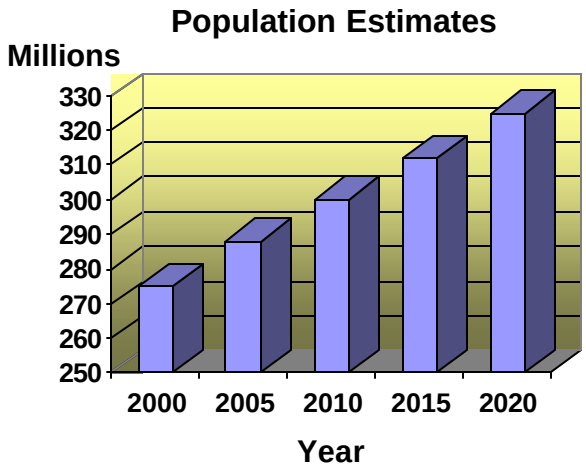
3.3 Occupancy in Public ROW

The public rights-of-way satisfies many needs of the public with vehicular and pedestrian traffic being the most visible. They also provide the space for a publicly owned utility, such as water, sewers, lighting and other communications systems who possess the right of occupancy by virtue of the ministerial power of government. Privately owned utilities, such as electric, gas, communications and other functions, can also occupy public right-of-way space by virtue of permits or franchise authorizations granted by state or local laws, statutes or other legislative actions.

Excavations in the public right-of-way need to be conducted in coordination with not only the regulating agency but with the other users of the right-of-way. These users range from the owner of other utilities that may be buried in proximity to the one being serviced to travelers and pedestrians using the roadway or sidewalks.

3.3.1 Increased Demands

A surge in new communications providers, deregulation of electric and gas industries and the need to upgrade aging water, sewer and drainage facilities is taking its toll above and below the ground in the public right-of-way space.



Population as well as business growth is continuing to occur at rates often faster than can be accommodated by existing infrastructure capacity. Adding new and reinforcing capacity is creating congestion in this limited resource, the public right-of-way. By the year 2020 it is estimated by the census bureau that there will be 50 million additional people requiring essential services in the United States.

The Telecommunications Act of 1996 has also revolutionized the formerly minimal and routine use of public and private properties for telecommunications purposes. What was one large initial construction of facilities project, and then many years of infrequent maintenance, are now many constant projects.

3.3.2 Facilities in PROW

Shown below are some of the facilities that can be found above and below the ground in a typical urban public right-of-way. All of these structures are important and need to be managed.

Pavement
Pavement Markings
Street Lighting
Traffic Control Devices
Signage
Curbs & Gutters
Storm Drains
Drive Approaches
Sidewalks
Trees
Retaining Walls
Pest Control Devices
Landscaping
Irrigation
Fire Hydrants
Sewer
Water
Electric
Transformers
Fire Alarm
Police Signals
Railroad Signals
Gas
Telephone
Terminal Equipment
Cable Television
Alarm Systems
Steam Systems
Petroleum Pipelines
Sewer Lines and Mains
Poles and Towers
Antennas
Conduit Systems
Roadside Sensors & Actuators

3.3.3 Joint Use

Over the past century, networks of facilities for the delivery of utility services to business and the general public have been developed and deployed. This not only involved wires, cables, pipes and various other apparatus, but also an array of structures to support them. Originally, each company built its own support structures such as aerial pole lines. It soon became apparent that neither the land nor the public would endure individual poles for each service; moreover, economics dictates that as many facilities as possible be placed on a single structure.

The evolution of pole structures has moved from sole use to joint use. For many decades this only involved two players the electric company and the telephone company. Today, you can find a number of additional attachments such as cable television companies, inter-exchange carriers, personal communications service carriers, municipalities and other governmental agencies and even individual corporations attaching to poles.

While the joint use of poles requires close coordination in construction and maintenance, the real complexities arise in design, cost breakdowns, leasing, accounting and invoicing.

3.3.4 Joint Building in the ROW

Using the concept of joint use, today new construction jobs are taking advantage of joint building. This type of activity saves multiple road cuts as well as additional interruptions in traffic flow and reduces the overall costs of the many projects. The photo to the right is in Boston, MA where 16 partnering companies built a facility that provided 116 cable pathways.

The use of abandoned facilities such as gas pipelines, water or sewer pipes is also another method used to reduce the impact to public right-of-ways and still provide the needed facilities.

4. Control Over Public Rights-of-Way

Local government is the recognized unit responsible to manage and control local rights-of-way, to ensure its safe and efficient use and to plan for community needs and provide needed public services. Below you will find a quick review of the units of government and additional detail of County and Municipal bodies.

4.1 Units of Government

There were 87,504 governmental units in the United States as of June 1997. In addition to the Federal Government and the 50 state governments, there were 87,453 units of local government. Of these, 39,044 are general-purpose local governments — 3,043 county governments and 36,001 sub-county general-purpose governments. The remainder, more than half the total number, is special-purpose local governments, including 13,726 school district governments and 34,683 special district governments.

4.1.1 County Governments

Organized county governments are found throughout the Nation except in Connecticut, Rhode Island, the District of Columbia, and limited portions of other states. In Louisiana, the county governments are officially designated as ''parish'' governments, and the ''borough'' governments in Alaska resemble county governments in other states.

4.1.2 Municipal Government

The term "municipal governments" refers to political subdivisions within which a municipal corporation has been established to provide general local government for a specific population concentration in a defined area, and includes all active government units officially designated as cities, boroughs[1], towns[2] and villages.

The number of municipal governments per State varies widely. Illinois, Pennsylvania, and Texas each have more than 1,000, while at the other extreme, there are seven states with fewer than 50 municipal governments each-Connecticut, Hawaii, Maine, Massachusetts, Nevada, New Hampshire, and Rhode Island. Five of these seven states are in New England where a town government often provides urban services provided by municipal governments in other states.

In the United States, nearly 154 million people live in areas with municipal governments, and about 64 million of these municipal residents live in cities of at least 100,000 population. Slightly more than one-half of all municipalities have fewer than 1,000 inhabitants. However, these small municipalities account for only 2.5 percent of the total population served by municipal governments.

[1] Except in Alaska

[2] except in the six New England States, and in Minnesota, New York, and Wisconsin

5. Public Works

Public works in the United States is a highly complex activity that involves all levels of government, a mosaic of specialized disciplines, manufacturers, material suppliers, financial investors, consultants, contractors and others.

5.1 Aspect of Public Works

The most significant aspect of public works as an activity is its public nature. Whether or not the actual delivery of public works services and facilities is provided through a public or private agency, public works involve an active role on the part of some government agency, to fund, manage or authorize the work to be done.

Unlike civil or other branches of engineering, whose work is complicated by location-dependent physical variable such as climate, terrain and soils, public works engineers and administrators must take into consideration subjective location-dependent variables such as: political institutions and values, economics, media attention and public opinion. As a result, public works, and how it is done will vary greatly from community to community, from region to region and from one time to another

5.2 Public Works Departments

Specific functions of a public works department include planning, designing, constructing, and maintaining streets, traffic, and drainage systems; administration and enforcement of building codes, zoning and private development ordinances; the use of public rights-of-way by public agencies, utilities, and private entities.

6. Management of the Public Rights-of-Way

Management of today's public rights-of-way is not a short-term commitment and requires both long-range planning as well as day-to-day monitoring. State constitution or law usually provides the right and responsibility to manage this public property to the municipality. Many public and private uses of the streets are for purposes other than vehicular and pedestrian traffic. Governments typically place sever mains, storm drains, street lighting, fire and police signals and traffic control systems in the streets. Utilities normally have gas, communications, electric, and pipelines within the same streets. Private interests may also impact this same street for sewer laterals, driveway approaches, walkways, retaining walls, temporary dumpsters, landscaping, private communication systems or even a parade. To coordinate the use of these areas and ensure that all necessary safety measures are taken to protect the public's interests, as well as existing facilities, a single entity customarily the Public Works Department, is given the responsibility to control use of the public way. A request review-approval system is usually applied to control use of the rights-of-way.

6.1 Permits

A permit is a covenant between a municipal government or agency and an applicant whereby permission is given to perform a specific act, on assurance that it will be done according to applicable standards including providing proper insurance, and that the applicant has the legal authority to secure the permit.

A Right-of-Way Permit System is a useful administrative tool that helps to maintain the integrity of public work facilities and enhances coordination among users of the public rights-of-way. The premise is that nothing should be constructed, altered, or installed and no uses or occupancies established or changed within the rights-of-way unless a permit is secured.

Permits should be required for all construction in public rights-of-way to; protect against damage and unsafe conditions, ensure proper placements and operations, provide access to underground facilities, guarantee that all work is done in accordance with all applicable standards, and control encroachments. The permit process must also, be in compliance with all applicable laws, codes, rules and practices.

6.2 Coordination

In order to promote safety, protect vital service and minimize disruption to the public during construction, the permit process needs to be coordinated with the utility notification process.

Knowing where an excavation is to take place and when it is to occur are vital to the proper management of rights-of-way assets. Coordinating this activity ensures that an excavator not only informs the utilities of his intent to excavate, but also has all appropriate permitting necessary to perform the excavation. This coordination further ensures municipalities that all activities within the rights-of-way are seamless, associated revenue is collected and public safety and interests are maintained.

At times an agency within the municipality or government unit will perform or sub-contract an excavation within the rights-of-way and not be required to obtain a permit but will have requested a mark-out through the one-call system. It is important to have the information for all excavations to properly maintain and manage the rights-of-way asset. A contractor or even a property owner may not obtain a permit when

they think that they are constructing outside of the public rights-of-way. Their reason could be time constraints, tax avoidance or lack of knowledge about the process, but the results could be an, unsafe condition, encroachment or an obstruction for future requirements.

Activities that take place without the knowledge of the permitting agency can often leave the agency with unknown liabilities.

6.3 Impacts to PROW

The installation, relocation, or repair of utilities can have a major impact on the public right-of-way. Often this work requires using space in the right-of-ways, either temporarily for work crews, or long term for the placement of utilities, and frequently may include actions that directly impact public works agencies and their costs. These actions may affect traffic flow in the corridor, traffic safety, access to abutting properties, cutting pavement surfaces for access to buried facilities, and so forth.

Continuous disruption due to the placement of new facilities or access to existing structures has caused multiple street closures and obstructions that can have a detrimental economic consequence for residents and businesses.

6.4 Pavement Cuts

Everyday thousands of street cuts are dug and restored in cities throughout the U.S. either to install new services or to upgrade and repair existing facilities. Restoration of pavement cuts rank as one of the top challenges facing municipalities and utility providers today.

Problems related to the restoration of utility cuts have been in existence for more than thirty years and can have a serious impact on the cost of maintaining public rights-of-way.

Pavement cuts have become a persistent problem due to the surge in new communications providers, deregulation of electric and gas industries and the upgrading of water, sewer and drainage facilities.

Recent experience in many cities indicates that excavations within the roadway are causing significant

disruption to the community, interruption to utility services, safety concerns and obstruction of the traveling public.

Damage occurring during these activities can have a significant cost to business, the general public and to the city or municipal governments. While the chart below shows the impact of a communications outage, similar costs would be incurred for interruptions of other services. Many times law suites are filed to recover these lost revenues. The basis for the suit in some cases has been negligent activities, use of unqualified contractors or for inadequately supervising a project.

Impact of Communication Outage on U. S. Business Customers (Average 5 hour outage)	
Brokerage Operations (Retail)	$ 32,000,000
Credit Card sales Authorizations	$ 13,000,000
Toll Free Number Promotions	$ 1,000,000
Pay Per View Services	$ 751,000
Home Shopping Channels	$ 570,000
Airline Reservation Centers	$ 450,000
Catalog Sales Centers	$ 450,000
Telephone Ticket Sales	$ 345,000
Cellular (new) Service Activation	$ 205,000
On-Line Network Connect Fees	$ 111,000
Package Shipping Service Requests	$ 41,000

Source: Contingency Planning & Management, March/April, 96

6.5 New Tools

While there many new and innovative technologies emerging each day, the key is in making all of them work together and have the ability to access some of the legacy data that has already been captured.

6.5.1 Geographic Information Systems (GIS)

GIS systems have been around for over 20 years at this point. By the narrowest of definitions, a Geographic Information System is a computer system capable of storing, manipulating, and displaying data that is referenced to geographical locations. System advancements over the last several years have made it possible to use GIS for resource management, investigations, development planning, emergency response, environmental simulation, patterned predictions, and an ever-expanding list of other possibilities.

Infrastructure facilities can be managed with increased efficiency and speed by using the dynamic decision-support tools that are available today and many more that are being enhanced or developed.

6.5.2 Mobile Computing

Mobile computing, the ability to take computer technology on the road represents one of the most dynamic technologies available in today's marketplace. The use for mobile computing can very well apply to 100% of today's working force. Mobile computing also gives the ability to localize decision-making, which in turn brings agency personnel closer to their customer base. There are various technologies encompassed in mobile computing such as portable and laptop computers, notebooks, sub-notebooks, and palmtops. Pen-based computing and wireless computing are other forms of mobile computing that allow the user to access information or applications from a remote site.

6.5.3 Global Positioning Systems

Use of the Global Positioning System is rapidly increasing as the technology is becoming more and more accurate, and at the same time the price of the equipment is declining. GPS has applications in many things including surveying, navigation, intelligent transportation systems (ITS), and 911 emergency calls. It can be used with any application in which the location of something needs to be known.

6.5.4 The Internet

The means by which government agencies, utility owners, contractors and builders, communicate with each other, and with the public are changing. For the first time in history, these professionals have a powerful, interactive, multimedia communications channel: the Internet. Direct, two-way communications of visual and spatial ideas with all of the entities involved in public works is possible. There is now the ability to make powerful connections between isolated pieces of information, supporting collaborative design, management and group decision-making.

7. Infrastructure

The condition of the Nation's infrastructure is a subject of widespread interest. The subject is a complex interrelationship of; infrastructure financing, the institutional arrangements involving all levels of government and the private sector, political structure, public works innovation, technical engineering, construction, ownership issues, management needs and improvements, assessments/forecasts, economic productivity, environmental issues and the legislative aspects of national public works policies.

Increased concerns over environmental protection, fiscal constraints on government budgets at all levels, and renewed emphasis on infrastructure performance are having profound impacts on the way the nation's public works are being managed, as well as changing funding priorities and government responsibilities.

Approximately 20 million miles of pipes, cables, and wires make up this country's utility infrastructure as well as many other facilities like, aviation, schools, dams, solid waste sites and many others. These facilities found above and below the ground help to provide for the excellent standard of living that can be found in most areas of the United States. Like many things, people have a tendency to take this standard for granted, and rarely are aware of the sometimes-invisible support systems that make our standard of living possible. We all rely on the infrastructure to support and improve the quality of our lives, and to underpin our economy.

> "That mealy-mouthed word, infrastructure. It sticks to the roof of the mouth like peanut butter on white bread. But there is no level of human concern in America-race, economic fulfillment of the individual, fairness/equality, social justice, competitiveness, raising the national spirit and standards of living-that is not addressed, attended to, and ameliorated by the contribution that the infrastructure makes to our well-being."
>
> *Jim Lebenthal -Vice-Chair, Rebuild America Coalition*

7.1 American Society of Civil Engineers Report

In 1988 the National Council on Public Works Improvements released an infrastructure report card with an overall grade of "**C**". Though many studies were published and statistics were collected infrastructure renewal and development had failed to remain a national priority. It was clear that without an easily understood measure of the nations infrastructure's health, no one could expect policy leaders or the American people to take action.

In the role of stewards of the infrastructure, prompted by the ten-year anniversary of the original report, the American Society of Civil Engineers (ASCE) developed its first Report Card for America's Infrastructure in 1998. ASCE convened an 11-member advisory council of national civil engineering experts to issue this new report card. They examined the available data for ten infrastructure categories. Based on their analysis, the infrastructure scored an overall grade of "**D**"-- a full letter grade decline since the 1988 report. The 1998 report card did help to prompt some action and Congress passed legislation providing record levels of authorized funding for roads, bridges, transit and aviation. It was clear that the Nation could not wait ten more years to examine how the infrastructure was doing, so using

the same methodology used in 1998, the ASCE has issued its report card for 2001, the overall grade is an alarming **"D+"**.

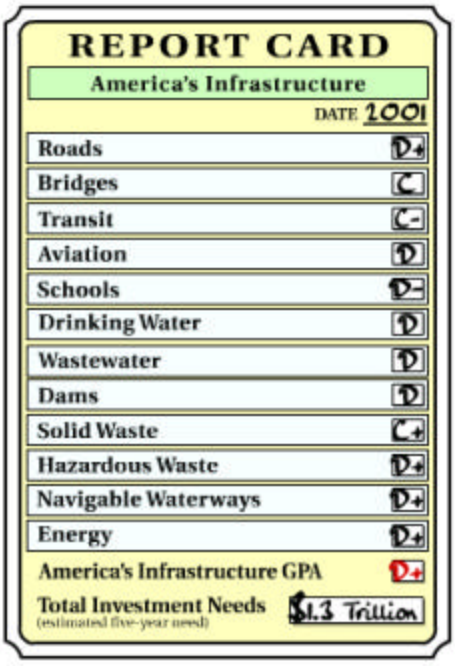
7.1.1 Full Report Card for 2001

Led by an 11-member advisory council, ASCE evaluated existing data reports for each infrastructure category. ASCE determined its grades by evaluating the infrastructure's by category with each evaluated on the basis of condition and performance, capacity vs. need, and funding vs. need.

Scale
A = Exceptional
B = Good
C = Fair
D = Poor
F = Inadequate

America's Infrastructure G.P.A.: **D+**

Total Investment Needs = $1.3 Trillion
(estimated 5-year need)



7.1.1.1 Roads

One-third of the nation's major roads are in poor or mediocre condition, costing American drivers an estimated $5.8 billion a year. Road conditions contribute to as many as 13,800 highway fatalities annually. Twenty-seven percent of America's urban freeways - which account for 61% of all miles driven - are congested. **D+**

7.1.1.2 Bridges

As of 1998, 29% of the nation's bridges were structurally deficient or functionally obsolete, an improvement from 31% in 1996. It is estimated that it will cost $10.6 billion a year for 20 years to eliminate all bridge deficiencies. **C**

7.1.1.3 Transit

Transit ridership has increased 15% since 1995 - faster than airline or highway transportation. Capital spending must increase 41% just to maintain the system in its present condition. **C-**

7.1.1.4 Aviation

Airport capacity has increased only 1% in the past 10 years, while air traffic has increased 37% during that time. Airport congestion delayed nearly 50,000 flights in one-month alone last year. Congestion also jeopardizes safety - there were 429 runway incursions ("near misses") reported in 2000, up 25% from 1999. **D**

7.1.1.5 Schools

Due to either aging or outdated facilities, or severe overcrowding, 75% of our nation's school buildings are

inadequate to meet the needs of school children. The average cost of capital investment needed is $3,800 per student, more than half the average cost to educate that student for one year. Since 1998, the total need has increased from $112 billion to $127 billion. **D-**

7.1.1.6 Drinking WATER

The nation's 54,000 drinking water systems face an annual shortfall of $11 billion needed to replace facilities that are nearing the end of their useful life and to comply with federal water regulations. Non-point source pollution remains the most significant threat to water quality. **D**

7.1.1.7 Wastewater

The nation's 16,000 wastewater systems face enormous needs. Some sewer systems are 100 years old. Currently, there is a $12 billion annual shortfall in funding for infrastructure needs in this category; however, federal funding has remained flat for a decade. More than one-third of U.S. surface waters do not meet water quality standards. **D**

7.1.1.8 Dams

There are more than 2,100 unsafe dams in the United States. There were 61 reported dam failures in the past two years. The number of "high-hazard potential dams" - those whose failure would cause loss of life - increased from 9,281 in 1998 to 9,921 in 2001. **D**

7.1.1.9 Solid WASTE

The amount of solid waste sent to landfills has declined 13% since 1990, while the amount of waste recovered through recycling has nearly doubled. Most states have ten years' worth of landfill capacity and waste-to-energy plants now manage 17% of the nation's trash. **C+**

7.1.1.10 Hazardous WASTE

Effective regulation and enforcement have largely halted the contamination of new sites. Aided by the best clean-up technology in the world, the rate of Superfund clean-up has quickened - though not enough to keep pace with the number of new sites listed as the backlog of potential sites is assessed. **D+**

7.1.1.11 Navigable WATERWAYS

The U.S. Army Corps of Engineers has a backlog of $38 billion in active authorized projects. On the inland waterways system, 44% of all the lock chambers have already exceeded their 50-year design lives. Key deep-draft channels are inadequate for the mega-container ships, which are the world standard for international trade; and intermodal connectors to ports are in poor condition. Transportation demand on waterways is expected to double by 2020, and serious performance problems are likely if current levels of investment continue. **D+**

7.1.1.12 Energy

Since 1990, actual capacity has increased only about 7,000 megawatts (MW) per year, an annual shortfall of 30%. More than 10,000 MW of capacity will have to be added each year until 2008 to keep up with the 1.8% annual growth in demand. The U.S. energy transmission infrastructure relies on older technology,

raising questions of long-term reliability. **D+**

7.2 Rebuild America Coalition

Founded in 1987 and managed by the American Public Works Association, the Rebuild America Coalition is a non-partisan, broad-based group of public and private organizations committed to reversing the decline in America's infrastructure investment and bringing infrastructure issues to the top of the national agenda. The coalition works to:

- Create public awareness of the need for sufficient infrastructure investment
- Demonstrate how we as a nation depend on sound infrastructure for an enhanced quality of life
- Urge action at all levels of government to meet infrastructure needs
- Encourage innovations in finance, research and technology
- Foster cooperation among public and private sector organizations in finding solutions to the infrastructure crisis.

The results of a nationwide poll[1] that asked individual citizens questions about infrastructure revealed that Americans relate infrastructure to quality of life issues and overwhelmingly support increased federal funding for the infrastructure that impacts their daily lives. Sixty-six percent (66%) of those polled described spending on America's infrastructure as a "strong investment in America." The poll also showed that Americans are willing to pay 1% more in taxes, provided they get what they pay for.

[1] For full results of this survey visit the Rebuild America Infrastructure Survey at http://www.rebuildamerica.org/reports/survey.html

8. Summary

Each year there are scores of serious accidents that kill and maim workers, pedestrians and motorists that can be directly associated to activities that occur in the public rights-of-way. Many millions of dollars are lost to disruptions to businesses and the community resulting from accident, or just inappropriate timing or unauthorized use of the Nations rights-of-ways. In addition the repair of pavement damage, because of improper restoration, costs taxpayers millions of dollars each year.

Public rights-of-way include the space, on, above and below the surface and are use for many purposes. Municipalities, as owners and stewards of the public rights-of-way, have a legal duty and responsibility to manage and balance all these essential and sometimes competing uses. To do this they must have the tools, to manage the rights-of-way for the health, safety, welfare and economic well being of the community.

The toolbox of the 21st Century is available today, and is filled with the many advantages that are needed to help manage the public rights-of-way. Real-time displays of activities and locations are available that will help coordinate and communicate with other agencies and vital service providers such as fire, police and paramedics.

Public works departments are already using many of the technology advancements seen over the past ten years. Many systems are already being used for the collecting, evaluating, maintaining, and applying information; this is a basic function of a public works department. The future will require more effective use of resources, and these resources include the use of the public rights-of-way

While today much of the emphasis is being placed on activities associated with new telecommunications systems the reality is that this may be only the beginning as the use of gray water systems or changes to alternative fuels for vehicles takes place. The need for extensive infrastructure replacement and rehabilitation is on the horizon and the use of the public rights-of-way will again be a major resource issue.

The future is in our hands today, finding innovative solutions and better management tools are the challenge we face.

9. Bibliography

This section contains a listing of the documents that were used as source material for this paper.

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[i] The Royal Road, built by the Persians after fall of the Lydian Empire in 546 BCE, went from Sardis to Susa originally, but was modified over the centuries as trade centers shifted with the times. Sardis, in the 6th century BCE was the capital of Greek lonia, while Susa was capital of the Persian Empire. Cyrus needed a quick and reliable route between Susa and his newly acquired territory, lonia. He has widened trails through forest, laid log roads across marshland and widened passes through mountains. Along this route, about 1600 miles in length, Cyrus has stationed over 100 rest stops and horse relays to aid his official messengers, very similar to the Pony Express in much later North America. The entire distance, Sardis-Susa, can be covered in seven grueling 24-hour days. The cost for the Royal Road in human labor, however, was incalculable.

[ii] Susa always the pride and joy of the Elamites and the Achaemenids, was settled around 4500 BC and lasted over 5000 years before finally demolished by the Mongols in the 13th

century AD.