NCHRP
SYNTHESIS 413

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Techniques for Effective Highway Construction Projects in Congested Urban Areas

A Synthesis of Highway Practice

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A Synthesis of Highway Practice

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. However, the accelerating growth of highway transportation develops increasingly complex problems of wide interest to highway authorities. These problems are best studied through a coordinated program of cooperative research.

In recognition of these needs, the highway administrators of the American Association of State Highway and Transportation Officials initiated in 1962 an objective national highway research program employing modern scientific techniques. This program is supported on a continuing basis by funds from participating member states of the Association and it receives the full cooperation and support of the Federal Highway Administration, United States Department of Transportation.

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The project that is the subject of this report was a part of the National Cooperative Highway Research Program, conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council.

The members of the technical panel selected to monitor this project and to review this report were chosen for their special competencies and with regard for appropriate balance. The report was reviewed by the technical panel and accepted for publication according to procedures established and overseen by the Transportation Research Board and approved by the Governing Board of the National Research Council.

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Cover figure: Looking southbound on US-75 approaching IH-635 to view HOV overpass under construction (center of the photo), part of High Five Interchange construction, in 2004. Photograph courtesy of Raul Medina III, Raul's Photography, San Antonio, Texas, www.rauls photography.com.

FOREWORD

Highway administrators, engineers, and researchers often face problems for which information already exists, either in documented form or as undocumented experience and practice. This information may be fragmented, scattered, and unevaluated. As a consequence, full knowledge of what has been learned about a problem may not be brought to bear on its solution. Costly research findings may go unused, valuable experience may be overlooked, and due consideration may not be given to recommended practices for solving or alleviating the problem.

There is information on nearly every subject of concern to highway administrators and engineers. Much of it derives from research or from the work of practitioners faced with problems in their day-to-day work. To provide a systematic means for assembling and evaluating such useful information and to make it available to the entire highway community, the American Association of State Highway and Transportation Officials—through the mechanism of the National Cooperative Highway Research Program—authorized the Transportation Research Board to undertake a continuing study. This study, NCHRP Project 20-5, "Synthesis of Information Related to Highway Problems," searches out and synthesizes useful knowledge from all available sources and prepares concise, documented reports on specific topics. Reports from this endeavor constitute an NCHRP report series, *Synthesis of Highway Practice.*

This synthesis series reports on current knowledge and practice, in a compact format, without the detailed directions usually found in handbooks or design manuals. Each report in the series provides a compendium of the best knowledge available on those measures found to be the most successful in resolving specific problems.

PREFACE

By Jon M. Williams
Program Director
Transportation
Research Board

Highway construction in congested urban areas is a challenge owing to high-traffic volumes, utility conflicts, complex right-of-way acquisition issues, a diverse stakeholder base, and watchful news media. This study focused on techniques used by transportation agencies to deal with these and other challenges. A highly diverse set of techniques were discovered, suitable for different needs. Four case studies are included to illustrate effective construction practices in congested urban areas.

Information was gathered through literature review and a survey of selected state DOTs and city transportation agencies.

Thomas R. Warne, Tom Warne and Associates, South Jordan, Utah, collected and synthesized the information and wrote the report. The members of the topic panel are acknowledged on the preceding page. This synthesis is an immediately useful document that records the practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As progress in research and practice continues, new knowledge will be added to that now at hand.

CONTENTS

TECHNIQUES FOR EFFECTIVE HIGHWAY CONSTRUCTION PROJECTS IN CONGESTED URBAN AREAS

SUMMARY

Construction projects in congested urban corridors have been a challenge for many years. High-traffic volume is just one of many concerns that need to be resolved. Adding significant utility conflicts and relocations, complex right-of-way (ROW) acquisition actions, a diverse stakeholder base, and more attentive media markets makes normally difficult work even more complicated.

This study focused on techniques used by transportation agencies to deal effectively with these and other challenges. Many different tactics have been tried with varying success levels. The purpose of this report was to identify strategies being used, determine how agencies rated their success, and examine applicability to other projects.

This study is in three parts. First, a literature review was conducted to examine published works relevant to this subject. Next, 21 states, and the city of Chicago and San Francisco County responded to a survey consisting of 68 questions aimed at illuminating the impacts and strategies associated with these urban projects. Finally, four case studies were examined and specific strategies described as used on those projects that would be interesting to the industry.

Key findings include:

- Contrary to common thought, most urban projects are valued at $100 million or less—as opposed to being mega-projects. Therefore, strategies must be designed to accommodate smaller projects in an urban environment.
- Design-bid-build is the most common contracting method used by these agencies for their urban projects. The agencies and their industry partners are comfortable with this long-proven contracting methodology.
- Financial incentives and disincentives are commonly used to address schedule concerns held by the transportation agencies.
- Utility conflicts and relocations are major factors that impact cost and schedule. Virtually every urban project is influenced by utility issues. Early and ongoing coordination are key to mitigating these impacts; however, no agency indicated their total elimination of such conflicts on urban projects.
- The ROW acquisition process continues to be cumbersome for both residential and commercial properties. If condemnation is involved, in many cases the process extends beyond a year. Under ideal conditions agencies would like to secure all ROWs before construction begins; however, in many cases they move ahead anyway when they are unable to fully clear all the parcels.
- The diversity of stakeholder groups is striking; however, agencies continue to focus most specifically on businesses, the traveling public, and elected officials. Standard tools such as public meetings and notices in the newspaper and on doorsteps are still used, but Internet utilization has now become dominant in communicating project information. Of interest is that the most common communication tools (e.g., newspapers and public meetings) are seen as being among the least effective and yet they continue to be used. The agencies do not typically have robust measurement tools in place for assessing the

effectiveness of their communication strategies. Emerging tools such as social networking sites have been tried, but are not yet used extensively.

- The media is a large part of the agency's efforts for disseminating information. In spite of anecdotal evidence to the contrary, agencies find the media to be a positive partner in this process and use that relationship to effectively communicate critical project information to stakeholders. Typically, inside spokespersons are used to work directly with the media, although agencies often augment their in-house staff with external resources.
- There is minimal reliance by these agencies on other modes of transportation to mitigate the vehicle throughput restrictions on a given corridor during construction. Little benefit is seen and commensurate effort is invested in these other modes. That said, early coordination with transit, bicycle, and pedestrian groups is seen as a good thing and most agencies do it but with the focus on accommodating their movements and not as a diversion of ridership.
- Every project must address traffic management. The consistency of the common strategies is significant, including frequent use of partial and full closures; liquidated damages assessed for poor performance; and agency focus on impacts beyond project limits. Almost every agency reported that they use their traffic management center as a tool for managing traffic during construction.
- Various approaches emerged from the four case studies. The actions were not consistent from project to project, but reflect conscious effort on the agencies' part to use actions unique to project circumstances. Actions such as incentives, management of road closures, communications with stakeholders, and others are relatively common. Noteworthy is that some of the common approaches were modified to suit the specific circumstances of the given project. These were then coupled with new innovations, such as the "windowed milestones" and "delayed start" clause, which further assisted in mitigating the impacts of transportation work in urban areas.

No single strategy will fit every project; however, the available choices offer solutions for many different needs. Early involvement is an important attribute of any mitigating strategy, whether dealing with utilities, ROW, stakeholder relations, or working with the media. Agencies use proven tools and modify them to meet current project needs. Innovation has paid off in significant benefits where agencies have moved to implement new ideas. Ultimately, the challenge for agencies is to find the right combination of new and old strategies to meet project's requirements.

CHAPTER ONE

INTRODUCTION

BACKGROUND

The challenges facing transportation agencies in delivering capital programs are greater than ever. Inadequate funding, congestion, increasing demands for service from users, freight issues, and mobility demands that outstrip available facilities are just a few. The problems are more acute and have more potential consequences in urban areas where, on some corridors, hundreds of thousands of vehicles travel each day through locations where improvements are needed.

One thing is certain—the number of complex projects in urban areas will likely continue to increase in the future. Aging highway infrastructures, right-of-way (ROW) constraints, and increasing urban populations lead to difficulties for construction projects on existing, congested, urban highways.

A number of factors add to the complexity of these projects:

- Many infrastructure systems share the same public corridors as highways, including utilities, rail, bus, bicycle, and pedestrian traffic.
- Urban highways often cross multiple political jurisdictions that are under the watchful eye of many stakeholders. Balancing the diverse needs of these jurisdictions and stakeholders requires special techniques and may cause delays in design and construction.
- These highways serve a variety of mobility needs including general public use, and commercial, freight, and emergency vehicle traffic. Maintaining traffic flow during construction is an important issue.
- Overall system mobility must be considered in a congested urban area undergoing construction, reconstruction, or rehabilitation.

Construction on highways under these conditions creates the need for special techniques. A wide variety of strategies has been employed across the country with varying levels of success. The purpose of this study was to review the innovative approaches developed by various state departments of transportation (DOTs) and local governments in dealing specifically with construction on highways in highly congested urban environments. The scope focuses on construction issues and on actions taken during any stage of project development that might lead to improved construction of highway projects.

PROJECT SCOPE AND OBJECTIVES

This project reviews strategies and practices employed by state DOTs and large cities to successfully deal with the aspects of urban corridors while delivering complex transportation projects. The attributes previously mentioned must each be mitigated or addressed. To secure the best possible data for national application, information was gathered from 21 states, the city of Chicago, and San Francisco County. This synthesis provides a wealth of practical experience that may benefit all who work or travel on urban highways.

Among the predicaments facing transportation agencies are the following:

- Utility conflicts,
- ROW acquisitions and constraints,
- Corridor use by multiple modes,
- High-traffic volumes,
- Complex stakeholder issues,
- Schedule constraints, and
- Financial considerations.

Over the years transportation agencies have adopted a variety of techniques to respond to these challenges. Included in this list of techniques or strategies are:

- Accelerated construction,
- Innovative contracting methods,
- Selected lane and road closures,
- Public involvement, and
- The use of economic evaluation decision-making tools.

Used singly or in combination, each of these approaches offers agencies the chance to reduce possible impacts on urban projects and find greater success in delivery efforts.

STUDY PROCEDURES

To accomplish the intended purposes of this study, a number of strategies were employed to obtain as much information as possible. First, a literature review was conducted seeking current documented and published knowledge from around the country. Second, a survey was undertaken of state transportation agencies and major cities. Participants were selected because they have one or more metropolitan areas of more

than one million people. In addition, this report contains detailed information from four cases studies of large urban projects, their strategies used and any lessons learned. Each entity was asked for input regarding methods used that proved successful, and to identify those that were less than effective.

The results of the literature review, findings from the survey, and information gathered from the case study interviews have all been compiled into this report.

SURVEY RESPONSE RATE

One of the most difficult aspects of research involving state DOTs is collecting data through a survey. Even with the advent of Internet-based tools to expedite the collection of information, state DOTs and cities are surveyed so often that it is difficult to achieve an acceptable level of participation.

For this study, the selection of states and cities to survey focused on those with urban populations of greater than one million people in the urban area; a response rate of 80% was deemed acceptable. In the United States there are currently 25 such states, thus requiring a response rate of 20 states. Ultimately, 21 states responded. In addition, Chicago and San Francisco County responded from among the many large cities that were solicited. This response rate provides a sufficient basis for achieving the desired outcomes of this project.

ORGANIZATION

The following is a summary of the 11 chapters and content:

***Chapter One—Introduction*:** This chapter includes a review of the study purpose, provides an overview of the issue of constructing projects in congested urban corridors, and establishes a foundation for the discussion presented in the remaining chapters. A short review of the study process is also included.

***Chapter Two—Literature Review*:** A summary of the literature for this project is presented that was analyzed for relevancy and content.

***Chapter Three—Program Overview*:** This chapter includes information on contracting methods used for urban construction, how those methods are chosen, the practice of incentives and disincentives, and other related information.

***Chapter Four—Utilities*:** This chapter reviews how utilities impact urban projects, the strategies used to mitigate those impacts, and an assessment of the strategies' effectiveness.

***Chapter Five—Right-of-Way*:** Important information about ROW acquisition for urban projects is presented. This issue is divided into private residential and commercial transactions, with key measures provided for both.

***Chapter Six—Stakeholder and Public Involvement*:** This chapter contains a summary of the practices employed by agencies to address the complex but important relationships with stakeholders. Public involvement strategies and their effectiveness are also explored in some detail.

***Chapter Seven—Media Relations*:** Urban projects by their nature have substantial media involvement. This chapter examines what these agencies are doing to effectively deal with the media and the approach they most frequently use.

***Chapter Eight—Multi-Modal*:** Few urban corridors service single modes of transportation. The norm is that multiple modes co-exist and operate together before and during construction. This chapter assesses the dynamics of intermodal issues in urban corridors.

***Chapter Nine—Traffic Management*:** This chapter focuses on how agencies contend with the substantial traffic volumes found in urban corridors. Techniques used, effective strategies, and the use of such tools as traffic management centers are all considered.

***Chapter Ten—Case Studies*:** Four case studies of specific projects are provided to offer further detail on how states manage urban projects.

***Chapter Eleven—Conclusions*:** Conclusions concerning the collected information for this project are detailed, with suggestions for future research offered.

Appendix A provides the complete survey instrument so that each question and its responses can be seen in context of the rest of the study, and Appendix B provides the complete responses from each of the agencies. Not all of their specific responses were included in the body of the report; therefore, this allows for the capture of all the information provided through the survey.

CHAPTER TWO

LITERATURE REVIEW

Congestion is not a new phenomenon and is not strictly reserved for urban areas. In some form it has been present since the first automobiles traveled the rutted roads of the early 1900s. Over the years it has been defined or measured as level of service, speed, travel time, and delays (*1*).

The amount of congestion and its documented increase is closely related to similar trends in population growth. The U.S. population more than tripled, from 76 million to 281 million, for the period from 1900 to 2000, with a projection of a 10% increase to 310 million over the next 10 years. A Texas Transportation Institute study showed that overcrowding of transportation corridors during peak travel times doubled in 75 metropolitan areas, from 33% in 1982 to 66% in 2000. Total congested time also increased from a daily average of 4.5 h in 1982 to approximately 7 h in 2000. However, congestion is not simply driven by population growth. Nationwide, significant delays are attributed to work zones on highways, traffic signals not synced, and weather (*2*).

Metropolitan areas continue to show greater growth when compared with their rural counterparts—80% of the nation's population is estimated to reside in large metropolitan areas (*3*). The high growth rate in metropolitan areas brings attendant impacts to housing, schools, retail, government services, and transportation. The Texas Transportation Institute studied 85 urban areas and reported 3.7 billion hours of delay resulting from congestion, equating to an average of 43 h of delay per person annually, costing more than $63 billion—$384 per person—in wasted time and fuel (*4*).

Although population areas of all sizes face congestion problems and smaller regions are witnessing an ongoing rise in delays, congestion in metropolitan areas is growing at a much faster rate, as shown in Figure 1 (*1*).

Highway construction struggles to produce capacity sufficient to address the demands of growth, with a scarcity of funding viewed as the primary reason for this failure. Two key factors exist that relate to available funding. First, much of the current highway infrastructure was built during the 1950s and 1960s and is in desperate need of replacement and/or repair. Second, and more importantly, road capacity has changed little over time compared with the rate of demand (*5*). This increased use results in growing congestion, which in turn fuels public discontent.

Often, congestion is not just construction related. In Figure 2, the FHWA shows that work zones represent only 10% of congestion problems, whereas other causes such as bottlenecks and incidents contribute significantly to the problem. Although bad weather merits its own notation, adding it to any of the other problems creates even greater traffic nightmares.

Without a doubt, population growth and roadway congestion are here to stay. Addressing these issues in a cost-effective and efficient manner, while gaining stakeholder buy-in, challenges all agencies. However, the concerns raised by users of our nation's transportation system go way beyond the simple numbers reflected in any discussion on congestion. More than "severity, magnitude or quantity of congestion," motorists look for "reliability of the highway system" and increasingly are unable to find it (*5*).

If the goal is to address the issue of increasing congestion on our nation's roads and highways then planning is critical to meeting this objective. Project costs and user demand are the two components of planning most often faced when advancing a major capacity initiative (*6*). An expert panel–focus group at the Midwest Transportation Consortium at Iowa State University concluded that the primary intent of the planning stage of a project should be to identify potential roadblocks to meeting project objectives, no matter what the scope of the work itself may be (*7*).

Gransberg and Molenaar in their 2004 article "Life-Cycle Cost Award Algorithms for Design/Build Highway Pavement Projects" believed that the outdated nature of today's highways was based on the low-bid-always-wins philosophy. With the new idea of design-build delivery, consideration is given to the whole of the project rather than just procurement. The authors believe and provide "best-value award algorithms" that support the concept that low bid is not always ideal in providing optimal solutions to transportation needs (*8*).

Three points help define the difficulty of perfectly timing congestion relief projects: First, stakeholder support of a project is not always measurable owing to the current economic conditions, more popular or newer projects being considered, and changes in technology. Second, once investment in a project has begun, there is no turning back; should a project be ill-planned or conceived, the investment cannot be recovered. This is especially painful in high dollar projects.

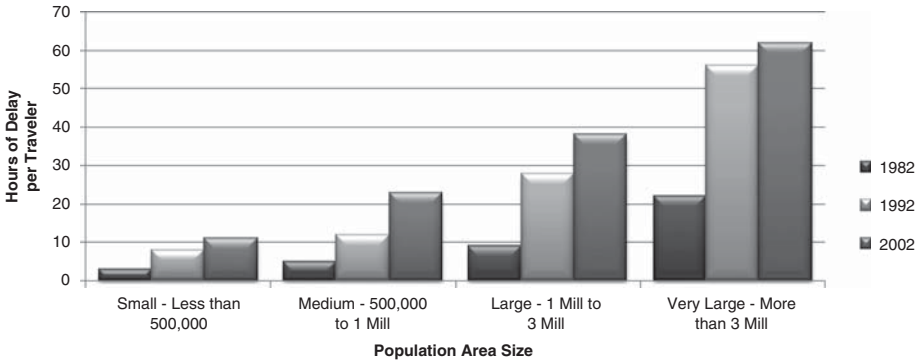

FIGURE 1 Hours of traveler delay by area population—Year-to-year comparison.

Third, delay in project completion results in a high level of public dissatisfaction (*6*).

The Oregon Department of Transportation (DOT) developed a policy and standard for work zone mobility. The standard requires an analysis before every project involving traffic flow concerns. Analysis is completed during the planning stage and adjusted through the design phase. The DOT then tracks and monitors construction results, creating a history for future project planning (*9*).

Stakeholder support is important in the planning stage of a transportation project. The need for faster, less disruptive treatment of out-dated highways prompted the California DOT (Caltrans) to conduct research in the form of their Long-Life Pavement Rehabilitation Strategies. On the three projects in this study, traffic data supported the importance of planning public communication campaigns. The study reported that advertising alternate routes or modes to motorists significantly lowered traffic demand in the work zone (*10*). In Arizona, the Pima Association of Governments is creating a standard of transportation safety for the Tucson metropolitan area. Through this plan, the Association has identified four techniques agencies use for work zone incidents:

- "Communication—not only among agencies (jurisdictional law enforcement and fire departments both public and private), but also with the public (through television/radio announcements and variable sign boards).
- Cooperation and coordination—move beyond communication to establishment of protocols on how to work together to manage the situation, protect the public, and address transportation mobility issues.
- Training—to ensure that public safety officers and other stakeholders have the understanding, knowledge, and training needed to handle emergency situations as they arise,
- Resources—response resources are commonly exchanged in disasters through mutual aid agreements and are an integral part of incident and emergency management" (*11*).

The Wisconsin DOT Facilities Development Manual lists a "Public Awareness Campaign" as the number one strategy when serious congestion is anticipated. Other strategies include advertising alternative routes, changeable message signs, radio, temporary pullouts, and incident planning with other state agencies (*12*). In the end, decisions made for any high-traffic work zone must consider development, environment, and stakeholder concerns (*10*).

When mitigating congestion, attention to ROWs and utilities is second only to planning in the overall effort. A survey conducted by NCHRP in 2000 found 11 states that listed state, local, or federal requirements as major roadblocks to

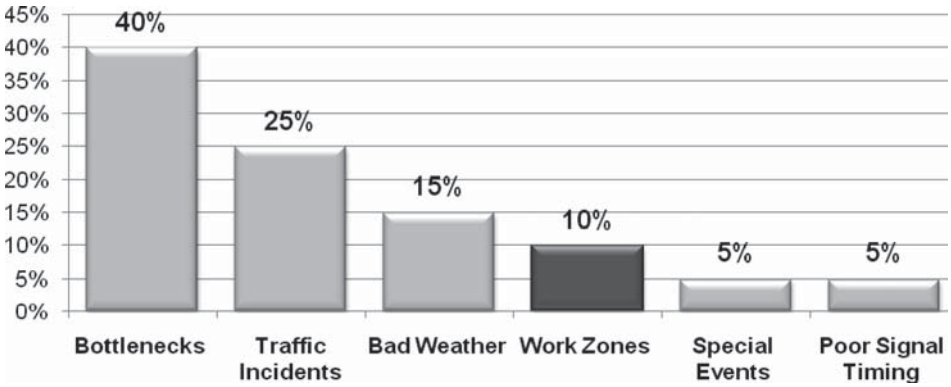

FIGURE 2 Sources of traffic congestion.

timely completion of ROW clearance. Gaining stakeholder trust during the ROW phase is a must, as transportation agencies must contend with human emotions and complicated legal requirements that could hinder the process and delay a project (*13*).

In a survey conducted for *NCHRP Synthesis 405: Utility Location and Highway Design,* only 20% of the states reported involving utility personnel in the planning stage of a project. As for collecting utility information, 10% reported gathering information in the topographic survey phase, 52%, during the early design phase, and the final 18% later in design or occasionally just before construction (*14*).

Utility conflicts occur at a high rate on most projects (*15*). In 2001, a similar survey to that of *NCHRP Synthesis 405* identified utility issues as the number one cause of construction delays (*16*). Transportation agencies, utility owners, and the public will always have conflicts that must be addressed. Although these conflicts are generally resolved before construction the financial impact on public agencies is significant. In another NCHRP study effort, it was determined that in the United States up to $120 million per year in contractor claims result from utility issues (*17*). One suggested resolution to this loss of construction dollars is inviting utilities to planning even pre-bid meetings to increase the understanding of the scope of the project and agency expectations. Ultimately, communication between all agencies and companies results in a higher success rate (*17*).

At the FHWA Making Work Zones Work Better workshop, authors Belobraydich, Mudd, and Griffin proposed a Utility Model Program, with the assumption that grouping common tasks creates a uniform and efficient program. The first element is training, including education with specific curriculum geared to the appropriate level of responsibility. Second, standards with clear objectives must be established with procedures, policies, updatable program features, and a focus on adherence to *Manual on Uniform Traffic Control Devices* (*MUTCD*) standards. Finally, defining responsibilities, including audits, enforcement, monitoring, established performance criteria, and employee commitment is essential (*18*).

Assuming the contractor is qualified and the utility is willing, the contractor can often do the actual utility relocation or adjustment work. This may resolve many scheduling and coordination issues between the utility and the agency, allowing the contractor to be more efficient. As mentioned previously, solid communication strategies, early planning, and close coordination are key to ensuring success (*16*).

Using established and proven tools is critical in overcoming construction issues in all project phases. The FHWA maintains a website with an interactive map linked to every state's current congestion mitigation activities (*19*). The FHWA also publishes an online "toolbox" with tutorials including Traffic Incident Management, Arterial Management, Pricing, Adding Capacity/Easing Bottlenecks, and 511 Traveler Information Telephone Services (see Figure 3) (*20*).

FIGURE 3 FHWA logo for the 511 traffic information program.

The Work Zone Safety and Mobility Rule (see Figure 4) is an example of available online help. This standard was first published in September 2004 in the *Federal Register.* The "Rule" addresses the most current issues dealing with work zone safety and mobility. Resources on the site include implementation examples, frequently asked questions (FAQs), guides and resources to assist in implementation, links to brochures and fact sheets, and links to presentations given at various meetings and conferences. States receiving federal-aid funding must comply with provisions of this rule (*8*).

Another tool is the Accelerated Construction Technology Transfer (ACTT), a "strategic process that uses various innovative techniques, strategies and technologies to minimize actual construction time, while enhancing quality and safety on today's large, complex multiphase projects." Recommendations include Design-Build (DB) contracting, advance coordination with utilities, using long-life pavements, improving general materials specifications, and introducing traffic flow strategies (*21*).

The Regional Concept for Transportation Operations is a management tool that has been developed to assist agencies perform in a "collaborative and sustained manner." Using this blueprint, agencies can work through all contingencies that may arise during the life of a project and can reach a consensus on solutions and mitigating strategies. The Maricopa Association of Governments in Arizona was a "trailblazer," using this tool in conjunction with the Maricopa Intelligent Transportation System (ITS) Committee. Using the Regional Concept for Transportation Operations philosophy, operations were coordinated between the Maricopa Association of Governments and the communities in the Phoenix metropolitan region (*22*).

FIGURE 4 FHWA work zone rule logo.

Additional tools include the Highway Performance Monitoring System. Data within the system defines "extent, condition, performance, use and operating characteristics of the Nation's highways." The Highway Performance Monitoring System was originally developed in 1978 and is regularly updated to reflect most current systems, legislation, technology, and reporting requirements (*23*). Additional tools include the *Highway Capacity Manual* (*HCM*)—including a specialized methodology used to collect traffic count data and capacity information (*24*). Included in the *HCM* is the Critical Lane Volume Analysis, which is a planning tool for specific intersection analysis, and Synchro, a traffic signal optimization tool. Some of these tools were used in the replacement of the Woodrow Wilson Bridge, which has a capacity of nearly 100,000 vehicles a day (*25*).

In addition to planning and analysis tools, agencies are seeking project delivery methods that may assist them in mitigating the impacts incident to urban construction efforts. One of these is Construction Manager-at-Risk (CMR). CMR represents "an integrated team approach to planning, design, and construction, to help control schedule and budget and to help ensure quality for the project owner." Members of the team include individuals with a vested interest in all phases of the project. The end goal of the CMR method is to "enhance constructability, manage risk and facilitate concurrent execution of design and construction." Many states have used the CMR program. The city of Phoenix has completed more than 200 CMR projects (*26*).

Caltrans uses CA4PRS (Construction Analysis for Pavement Rehabilitation Strategies) in the design phase of its projects. CA4PRS was developed by the Institute of Transportation Studies at the University of California at Berkeley under an FHWA study. CA4PRS can be used to "identify optimal rehabilitation strategies that balance the construction schedule with inconvenience to drivers and transportation agency costs. The program considers 'what if' scenarios for such variables as rehabilitation options, available construction windows (i.e., nighttime, weekend, or continuous closures), number of lanes to be closed for rehabilitation, material selection, pavement base type, and the contractor's logistics, including access to the site and production rates. The CA4PRS results can also be integrated with traffic simulation tools to estimate road-user delay costs arising from construction. The software aids in establishing schedules, developing construction staging plans, estimating cost (A) + schedule (B) contracts, and calculating incentive and disincentive specifications for contracts" (*27*).

Another tool successfully used by Caltrans is their "VA" (Value Analysis) program. It is a system for "enhancing product value by improving the relationship of performance to cost through the study of function." By using a function-oriented, systematic team approach, Caltrans is successful in improving the value of the product, design, system, or service. VA is also key for problem solving and cost reduction. Best results of the VA program happen with early implementation (*28*). The VA program works under Value Engineering (VE), as described on the FHWA website. "A VE Program is comprised of more than just the collection of studies or workshops that are completed, and the number of recommendations implemented. The program also includes well-established policies and practices that fully integrate VE into the surface transportation program and increase the overall effectiveness of the VE methodologies." States that are successful have implemented training programs and worked to raise awareness of VE program benefits (*29*).

An example of how VE studies have been implemented to benefit a project includes the work done on the New Jersey Route 206 Bypass. This project covered two communities, with the first supporting the project and the second being opposed. A VE study was conducted for the citizens of both areas. Through the VE process both sides expressed their concerns and ultimately the New Jersey DOT reached agreement and buy-in from all involved (*29*).

Surprisingly, little exists in the literature about how agencies make decisions regarding the pursuit of urban projects as a whole from an economic benefit standpoint. What does exist in the literature are descriptions of methodologies for selection-specific project elements such as pavement type. The Gransberg and Molenaar report, "Life-Cycle Cost Award Algorithms for Design/Build Highway Pavement Projects," focused on using life-cycle cost analysis in the use of a best value selection process in a DB environment (*8*). The FHWA established a policy in response to the National Highway System Act of 1995 that requires a life-cycle cost analysis on high-cost projects. Again, the focus is on specific project elements, usually pavements, and not on the greater economic impacts of the project as a whole (*30*). In the end, sharing information and statistics among organizations results in optimal planning and design. This requires agency staff from all organizations to fully cooperate. In Houston, Dallas, Ft. Worth, and San Antonio, regional organizations house employees from multiple agencies in the same building, allowing for frequent interaction. Field operations can connect to central locations through systems such as SmartTrek in Seattle, Commuter Link in Salt Lake City, or AZTech in Phoenix (*31*).

Transportation projects are complex at best. Congestion continues to grow in relation to increases in population. However, population growth is not the singular reason our nation's highways are overcrowded and users experience delay; incidents, bottlenecks, and other factors all contribute. Effective planning is shown time and again as a key to not only crafting proper solutions to relieve congestion but also to implementing projects in such a way that construction efforts do not have an inordinate impact on travelers.

Utilities and ROW acquisition processes effect projects negatively and cannot be ignored. Early coordination is a

key, but many agencies are still frustrated with the financial and scheduling impacts they cause.

In a recent study sponsored by NCHRP entitled "Utility Location and Highway Design," the state of the practice is studied in depth. Actions taken by the state DOTs vary in terms of what they do and when they do it to mitigate the impacts utility conflicts have on their projects. The author found that 85% of the states do not have a specific policy governing the decision to design around or relocate a conflicting utility. Of note are the actions of three states: Georgia, Pennsylvania, and Virginia. In Georgia they developed a Utility Redline Software package that facilitates the transmittal of plans between the agency and utility owners. They have also implemented an aggressive training program for their employees to raise awareness and improve effectiveness in dealing with utility companies.

The Pennsylvania DOT has a policy where a contractor can perform subsurface investigations at the agency's expense if it suspects that the information provided in the plans is in error. This has encouraged the DOT to be more attentive to the information it provides and resulted in improved plan information. Pennsylvania also had a change to their "One-Call" statute, which requires the use of subsurface utility engineering for all projects with a value in excess of $400,000.

Finally, Virginia started a program in 2000 where the agency pays the utility companies for their cost of engineering for utilities that are in conflict with their highway work. Efforts to improve the decision-making process to relocate or avoid a utility have saved up to a year in the project delivery schedule (*14*).

A second report published as part of the Strategic Highway Research Program, "Encouraging Innovation in Locating and Characterizing Underground Utilities," found that a low-cost, effective means for locating all underground utilities does not exist and hampers designers in their plan preparations. Some advances in technology and "tagging" of utilities offer promise, but widespread deployment is well into the future. Encouraging the use of subsurface utility engineering is seen as a strategy that can be combined with greater coordination and the use of emerging and existing technologies to avoid the impacts currently experienced with utility conflicts.

A variety of tools have been developed to help agencies in the planning and execution of their construction projects. These provide assistance and appear worthy of further examination and implementation by agencies across the country.

No silver bullet emerges from this review of the state of the practice in mitigating the impacts of construction in urban areas. Nevertheless, useful information is clearly available to assist agencies in these endeavors. In crowded metropolitan areas, complexities increase substantially; however, using established processes and tools enables success at any level.

CHAPTER THREE

PROGRAM OVERVIEW

The survey of transportation agencies solicited information about the characteristics of their respective capital programs. This information serves as a backdrop to the other data obtained and provides insights into the nature of each program in terms of dollars and other attributes. Figure 5 shows how the states responded when asked about capital program size.

Thirteen states, or more than half of the responding states with urban areas of more than 1 million people, have capital programs of more than $1 billion per year. Another six identified expenditures of between $500 million and $1 billion. It is no surprise that states constructing projects in highly congested corridors have large programs. Note that San Francisco County and Chicago have substantial programs in their own right.

Further examination of project types revealed a number of important trends. Responses to the question about what typical projects are constructed in urban corridors included all of the following:

- Improvements on urban arterial streets with minimal access control,
- Improvements on urban arterial streets with aggressive access control, and
- Improvements on controlled access highways.

Each of the states reported having all three project types. The uniformity of project type allows for greater correlation of the data found in the rest of this report.

Understanding trends in typical project size among responding transportation agencies is useful. Note in Figure 6 that when agencies reported on size trend for urban projects, the majority of the projects were under $100 million. This indicates that the typical project would not be considered a "mega-project" and shows that the strategies identified in this report can be applied to a significant size range of urban projects—not only the very largest. Arizona, Missouri, San Francisco County, and Texas reported more frequent use of projects valued in excess of $100 million.

Recognizing the challenges and uniqueness of these urban projects, the agencies all responded that they take special measures to address these circumstances. When queried about whether the measures were implemented on a project-by-project basis or the programmatic level, 42% indicated a project-specific approach and 48% reported that they employ measures at both project and programmatic levels, as shown in Figure 7.

When asked if they used special measures to deal with urban projects, the most common one mentioned was managing traffic either through a traffic operations center, work hour restrictions, or other management strategies to mitigate the impacts of high volumes of vehicles.

Seeking further clarification about these measures, the survey asked respondents to specifically identify those they employed, with the results shown in Table 1. On this and other questions in this section of the survey the agencies mentioned aggressive management of lane closures and night work, the use of Context Sensitive Design and the use of ITS.

Examination of Table 1 reveals an interesting phenomenon. The five most commonly identified actions are:

- Coordination with local communities
- Different contracting methods
- Work hour modifications
- Context Sensitive Design or Context Sensitive Solutions
- More use of consultants.

The contrast between the most common and the least often utilized strategies is noteworthy. The least-mentioned actions included training employees, offering pay differentials for specialized work hours, and staffing changes. Each of these would reflect an investment in the agency in-house staff. Conversely, the top five listed previously do not represent such a strategy. This is a clear message that actions employed to address these complex construction projects center more on external and physical actions and not on employees or organizational actions that might be part of successful solutions.

For many years states used the standard design-bid-build (DBB) approach to project delivery for virtually all projects. With DBB the owner designs or hires a consultant to design the project, then procures a contractor for actual construction. Typical benefits of using DBB include:

- A simple process that is well understood by all participants,
- Risk and rewards that are clear,
- A high level of public acceptance, and
- A process that is considered fair (*32*).

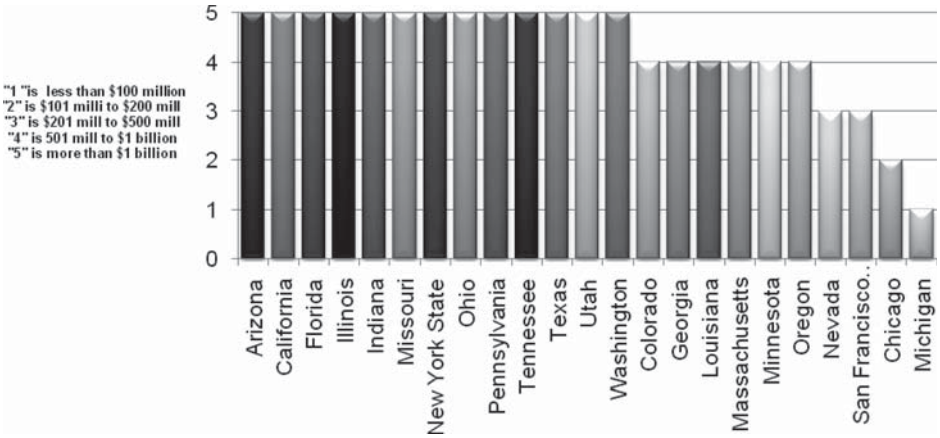

FIGURE 5 Size of state's annual capital improvement program (see Question 9).

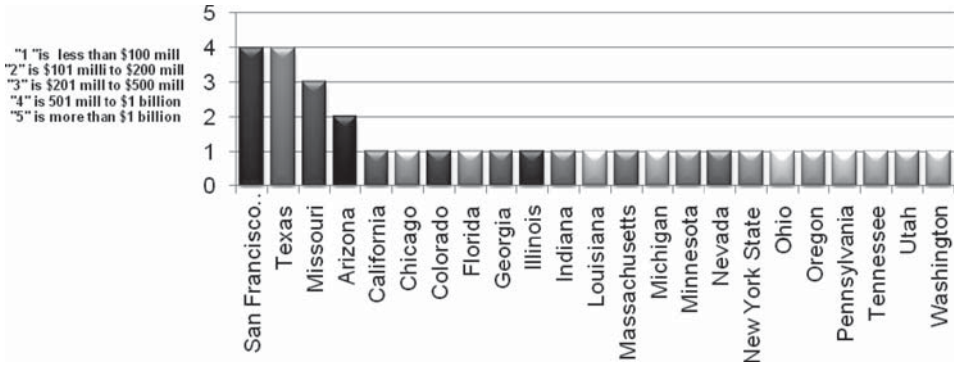

FIGURE 6 Trends in urban project size most prevalent in states (see Question 11).

Since the 1990s, transportation agencies have also used the design-build (DB) process. With this approach the owner hires a team that includes a contractor and a designer; together they are responsible for the finished project. Attributes of DB include:

- A single contractor and designer team that provides for more effective coordination;
- Projects that are typically priced in a lump sum format, allowing for a level of price certainty not present with DBB;
- More innovation that often results from the combined contractor/designer team; and
- Owners that frequently specify project deliverables as opposed to means and methods.

The selection of DB as a delivery method is based on a number of desired outcomes. They include in order of priority:

- Shorten duration
- Establish cost
- Reduce cost

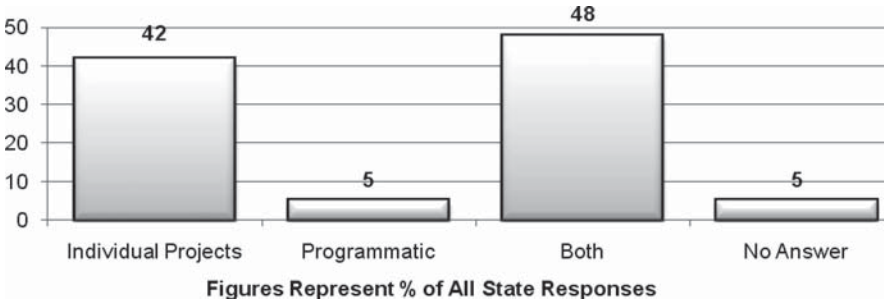

FIGURE 7 Special measures taken as individual projects or programmatic (see Question 13).

TABLE 1
TYPES OF ACTIONS TO ADDRESS CONGESTION IN URBAN PROJECTS

What types of actions has your agency taken to address the issues associated with construction of projects in congested urban corridors?	
Actions Taken	% of State Response
Coordination with local communities	96
Different contracting methods	87
Work hour modifications	87
Context sensitive design or context sensitive solutions	83
More use of consultants	65
Organizational or structural changes in your agency	30
Changes in staffing	26
Other	22
New or different equipment	17
New or specialized training for employees	17
Pay differentials for employees working on these projects	13
No actions	4

Owing to multiple choices percentages do not equal 100%.

- Constructability/innovation
- Establish schedule (*33*).

Some states (e.g., Arizona and Utah) are beginning to use Construction Manager/General Contractor (CM/GC) or Construction Manager at Risk. The name and attributes differ from state to state and their statutes will be different as well, but the basic process remains the same. The owner, contractor, and designer enter into an agreement where engineering and construction are completed in a collaborative environment and risks are shared in ways that result in project cost and time savings. Often, financial incentives are used that benefit all parties (*34*).

Agencies also identified a common use of A + B contracting where price is one factor (A) and time (B) is the other. Massachusetts, Nevada, Pennsylvania, Tennessee, and Utah have all used this approach.

The most commonly used method was overwhelmingly DBB. The comfort contractors and owners still have with DBB, and the sheer number of projects using DBB, account for continuing its use. Nevertheless, states such as Arizona, Florida, Utah, and Washington are using DB for a large number of urban projects. Even in states that lead in using alternative project delivery methods such as DB, the vast majority of work is still traditionally done using DBB.

When asked why they used the preferred contracting method, the agencies offered the reasons found in Table 2. The rationale varies but the selected process, DBB, remains the same.

In their narrative responses many agencies mentioned that legislative requirements often limited or controlled how they were able to use innovative delivery methods such as DB or CM/GC. Table 3 contains additional comments offered by the agencies.

TABLE 2
REASONS FOR CHOOSING DESIGN-BID-BUILD

What are the reasons for choosing the method identified in Question 15?	
Reason for Choice	% of state response
Ease of contract administration on the part of your agency	48
Required by rule or law	43
Other	35
Price certainty (knowing what the final cost will be)	26
Shorter construction schedule	22
Improved management of stakeholder issues during construction	17
Opportunities for innovation on the part of designers	13
Improved management of traffic during construction	13
Opportunities for innovation on the part of contractors	9
Pressure or input from elected officials	4
Pressure or input from industry groups or associations	4

Owing to multiple choices percentages do not equal 100%.

TABLE 3
COMMENTS FOR QUESTION 16

DBB is our standard practice; we use DB on a limited basis.	Louisiana
Traditional method for bulk of contracts. Alternatives being tested and considered.	Massachusetts
DBB is the traditional project delivery method used at CDOT.	Colorado
The reality is that the majority of work in our urban areas is approached through traditional methods.	Washington
It is our standard contracting method, thus it is used on most projects.	Oregon
Standard procedure.	Michigan
Our standard method used for many years.	Nevada
Low bid.	Arizona

The agencies were asked whether or not financial incentives were used to influence behavior and outcomes on urban construction projects and the majority answered in the affirmative. The basis for using incentives to influence the outcome of a project varied among the agencies, but several emerge as the primary motivators, as shown in Table 4.

Notably, the top two reasons focused on an owner's desire to influence the project schedule or overall completion. The third most noted response was to reduce the impact on the traveling public. Surprisingly, only 26% used financial incentives to achieve quality objectives. Based on the author's experience, quality incentives are often used by agencies for work items such as asphalt pavement quality or smoothness of portland cement concrete pavement and less for other contract work. This most likely accounts for the low ranking shown in the survey results.

All the agencies surveyed reported that they use financial disincentives to achieve certain objectives. Table 5 ranks responses to this question. For these agencies, motivation to use incentives follows the same order of priority as for the use of disincentives.

Commonly, transportation agencies use incentives and disincentives in combination with one another and the survey instrument was designed to elicit information about this relationship. Figure 8 shows how the agencies responded to

TABLE 4
REASONS FOR INCENTIVES ON URBAN CORRIDOR PROJECTS

What are the reason(s) for using incentives on your urban corridor projects?	
Reason for Choice	% of state response
Shortens the construction schedule	91
Finishes the project and opens it by a certain date	87
Reduces the impact of construction on the traveling public	83
Promises to the public or elected officials	57
Improves the overall quality of the project	26
Other	0

Owing to multiple choices percentages do not equal 100%.

TABLE 5
REASONS FOR USING DISINCENTIVES

What are the reason(s) for using disincentives on your urban corridor projects?	
Reason for Choice	% of state response
Finishes the project and opens it by a certain date	91
Shortens the construction schedule	87
Reduces the impact of construction on the traveling public	87
Promises to the public or elected officials	70
Improves the overall quality of the project	30
Other (see Table 6 in chapter three)	13

Owing to multiple choices percentages do not equal 100%.

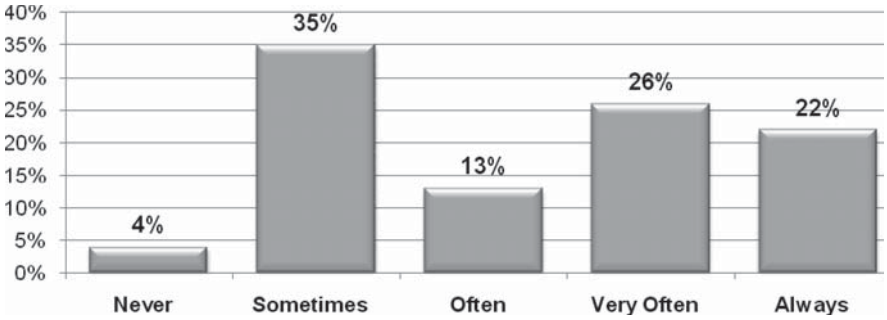

FIGURE 8 Financial incentives and disincentives (see Question 21).

TABLE 6
COMMENTS FOR QUESTION 20

Reduce the number of bidders with limited resources.	Colorado
Reduce bad press of an ongoing project.	Pennsylvania
Maintain contract work schedule to avoid special community events.	Pennsylvania
Liquidated damages are considered as disincentives.	Oregon
See comments for question 18.	Utah
Disincentives are in the construction contract as road users liquidated damages.	Pennsylvania
FDOT matches its incentives with equal disincentives.	Florida

the question about whether or not they used financial incentives and disincentives on the same projects. Only one agency noted that it never combines these strategies. On the other hand, 61% use combined incentives and disincentives: "Often," "Very Often," or "Always."

This overview of projects and agency approaches to their delivery offers a glimpse into the circumstances under which they are constructing their work in urban corridors. The most common delivery method used is DBB, although some use of alternative methods such as DB and CM/GC were identified. Urban projects are typically associated with the mega project label; however, these agencies reported that the trend is toward projects valued at $100 million or less. Incentives are used by the majority of the agencies to achieve schedule objectives and reduce the impact of the work on the public.

In addition to the quantitative information gathered through the survey, agencies were also asked in many of the questions to provide qualitative information (see Table 6). The full account of these responses is found in Appendix B.

CHAPTER FOUR

UTILITIES

BACKGROUND

Urban corridors are not only congested with vehicles and people but also filled with utilities, each one a potential conflict for the planned work. For many years, the natural pattern has been to install utilities in streets and highways. Utilities can take many forms, whether aerial or underground. Some are privately owned and others owned by municipalities, such as a local water company. A variety of telecommunications providers have facilities in public ROWs. Power and gas lines are often public utilities regulated by a public utilities commission and found in the highway ROWs. In addition, local irrigation districts, sewer districts, and others may have facilities in urban corridors under construction. Although not a utility per se, storm drains are a major underground element on most urban projects.

Almost all projects require the relocation or adjustment of existing utilities. When conflicts exist, either the utility owner or the agency's contractor must make necessary changes. The extent of relocation depends on the corridor and the nature of the work. Those familiar with urban corridor construction may recall projects where the actual corridor improvements (e.g., new pavement, drainage, traffic signals, and bridge construction) appeared almost incidental to the amount of preliminary utility work. Ultimately, the presence of utilities on these projects represents a potentially high-cost/high-risk factor during construction.

UTILITY IMPACTS

This project sought to better understand the frequency of utility conflicts, impacts on the actual construction work, and the best strategies agencies use to prevent negative outcomes on urban projects. Figure 9 reflects on how the agencies responded to the question of how often utilities impact urban corridor projects. Thirty-nine percent reported that utilities were "Always" a problem in urban corridors and another 30% said "Very Often." The total of "Often," "Very Often," and "Always" was 91%. Clearly, utility impacts are seen as a significant problem.

How these impacts influenced urban projects was the next logical query of the surveyed agencies. Table 7 shows the response. Top influences were "Schedule," "Financial," and "Contract Administration." Because 100% of responders identified "Schedule" as the top impact from utilities in the urban corridors, the results from chapter three—Program Characteristics—become more interesting. The top reasons for offering incentives and disincentives as reported in that chapter were the owners' desire to influence the schedule and complete projects on time. Given the schedule impacts of utilities on urban projects and the desire for on-time completion, the concern over this element is understandable.

Strategies used by the transportation agencies to mitigate the impacts of utilities on complex urban projects were examined for trends and effectiveness. Tables 8 and 9 show how the states responded to Questions 25 and 26, and Tables 10 and 11 provide comments ("Other") to these questions.

- Question 25—What strategies has your agency used to mitigate the impacts of utilities on the urban corridor construction projects administered by your agency?
- Question 26—Which of the following have your agency found to be most effective in dealing with the impacts of utilities in congested urban corridors?

Answers to Question 25 reflected that early and ongoing coordination are the most common strategies used. The message from the agencies is that coordination starts long before a project is let or even in the advertisement phase. A distant third action was paying some relocation expenses even if not required by law. Although anecdotal in nature, this third strategy is gaining ground in terms of how widely it is being used to expedite, remove conflicts, and generate good will with utility owners.

In reviewing the information found in Table 8, even though early and ongoing coordination with utility owners is most common, they also indicated that not all of these efforts work well; 96% reported that they did early coordination, but only 83% said it was effective. In the case of ongoing coordination, 83% said they do it, but only 57% said it was effective.

The agencies were also asked to identify in narrative fashion specific strategies they found useful in dealing with utilities and their impact on urban construction. Again, the most common was ongoing coordination during construction. Nevada responded that it has quarterly coordination meetings in the northern part of the state and monthly meetings in the Las Vegas area. In Pennsylvania, meetings are held bi-monthly in the regions and annually at the state level. The Pennsylvania

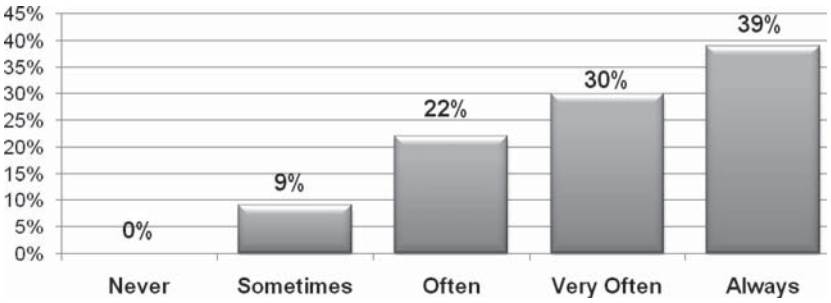

FIGURE 9 How often do utilities impact reconstruction efforts on urban corridors (see Question 23)?

TABLE 7
IMPACTS UTILITIES HAVE ON CONSTRUCTION EFFORTS IN URBAN CORRIDORS

What is the nature of the impacts utilities have on the construction efforts in urban corridors?	
Influences or Impacts	% of State Response
Schedule	100
Financial	70
Contract administration activities on the part of the agency	70
Stakeholder relations	43
Quality of the work	30
Number of bidders on a project	4
Other	4

Owing to multiple choices percentages do not equal 100%.

TABLE 8
STRATEGIES USED TO MITIGATE IMPACTS ON UTILITIES

What strategies has your agency used to mitigate the impacts of utilities on the urban corridor construction projects administered by your agency?	
Strategies	% of State Response
Early coordination with impacted utility companies	96
Ongoing project-specific coordination meetings with utility companies even before construction is started	83
Payment of some relocation expenses even if not required by law	39
Other (see Table 10)	31
Payment of all relocation expenses even if not required by law	13
Modifying state law to require more effective coordination between your agency and the utility companies	13
Litigation	9

Owing to multiple choices percentages do not equal 100%.

TABLE 9
ACTIONS FOUND TO BE EFFECTIVE IN DEALING WITH THE IMPACTS OF UTILITIES

Which of the following has your agency found to be most effective in dealing with the impacts of utilities in congested urban corridors?	
Strategy	% of State Response
Early coordination with impacted utility companies	83
Ongoing coordination meetings with utility companies even before a specific project is started	57
Other (see Table 11)	30
Payment of some relocation expenses even if not required by law	17
Modifying state law to require more effective coordination between your agency and the utility company	13
Payment of all relocation expenses even if not required by law	4
Litigation	0

Owing to multiple choices percentages do not equal 100%.

TABLE 10
COMMENTS FOR QUESTION 25

Contracted project-specific utility location staff to represent a local public utility owner during construction.	Oregon
With prior approval utility has been incorporated into the construction contract; when the work was completed, the utility has reimbursed the state for the cost.	Pennsylvania
Subsurface engineering (potholes) to identify conflicts.	Nevada
Payment for utility relocation is precluded by constitution in Washington State.	Washington
Communication with the utilities is proactive. The utilities are notified annually of upcoming construction projects in their area. Utilities are invited to state quarterly meetings and regionally bimonthly meetings to discuss upcoming highway projects. To coordinate work schedules for specific projects the utilities are invited to scoping and design field views, and then during construction they are invited to the bi-weekly construction meetings.	Pennsylvania

TABLE 11
COMMENTS FOR QUESTION 26

We have not found an effective method.	Colorado
Including utility costs in contractor bid price for lump sum DB projects to incentivize minimization of utility relocations.	Utah
On DB—WSDOT has transferred our legal rights to the contractors.	Washington
None of the above.	Illinois
Include relocation as part of the contract so the prime contractor is responsible.	Tennessee
Separate construction contract for early relocation of utilities.	Arizona
Separate and advance utility relocation contracts.	San Francisco

DOT also makes an effort to notify utility companies about their upcoming annual program so that owners know what to expect. Oregon uses specific staff members who focus on utility issues to ensure timely coordination.

The results from this portion of the survey show that agencies identified utilities as a major area of concern and impact on urban construction projects. Indeed, it is one of the constants of urban construction that utility impacts must be planned for and dealt with. Of most concern to the agencies is how utility conflicts and relocations might impact their schedule or what financial issues might emerge. They are proactive in efforts to prevent even more schedule or cost issues than already occur, with early and ongoing coordination being the keys to mitigating utility impacts. None of the agencies believed that the influence or issues relating to utilities could be totally eliminated.

CHAPTER FIVE

RIGHT-OF-WAY

ROW has unique issues when constructing projects in urban corridors. Urban projects where ROW acquisition is not required are rare. Even the simplest projects require purchasing properties for newly aligned ramps, geometric changes at intersections or interchanges, or widening pavement sections.

ROW impacts vary: this study first sought to understand how urban projects were influenced. Figure 10 shows how the agencies responded to the question exploring this topic. The agencies were asked to identify which aspects of ROW acquisition were most challenging. The responses identified three particular areas:

1. Property owner expectations for compensation (56%).
2. Relocation of commercial property owners (50%).
3. Too little time to complete acquisitions (40%).

In completing projects such as this it is often informative to see what elements of a particular process or activity are not as significant as the others (see Figure 11). In this case, the following were least likely to be identified as problematic in the overall acquisition process:

- Inability to hire outside staff to augment agency resources (0%).
- Inadequate funding (17%).
- Real estate market conditions (17%).

This query attempted to assess how the ROW acquisition process might impact the project schedule. Although some states have difficulty completing the design in time to achieve the desired bid dates, in others, such as Indiana, property acquisition is the critical path and determines when a project is bid and constructed.

Participants answered questions regarding both residential and commercial properties. Three issues were explored for each type. The first two were:

1. How long did the acquisition process take if condemnation was not involved?
2. How long did the acquisition take if condemnation was involved?

Tables 12 and 13 contain this information for residential and commercial properties, respectively.

The responses are enlightening in how significant a time issue ROW acquisition is for urban projects. In both residential and commercial cases, when an agency exercises its rights to condemn a property, resolution requires from 6 months to more than a year. Given that condemnation proceedings cannot begin until an agency has completed the Record of Decision for a project, this means that a project is well advanced before the purchase process can begin. If condemnation is not required, then 57% of residential and 38% of commercial properties are acquired in 6 months or less. The key to this process appears to be avoiding condemnation if schedule considerations are an issue.

Combining the information found in Figures 12 and 13 with that in Tables 12 and 13, the relationship between the impacts of condemnation and its frequency become evident. This shows that one-half of the commercial properties require condemnation, and the time frame for that process could exceed a year. In residential condemnations, this situation does not occur as frequently and has less time impact. This trend must be recognized as a critical factor in scheduling activities.

This study sought to identify strategies used by agencies to address the previously mentioned dynamic. Table 14 shows the strategies employed and how respondents rated the effectiveness. The top three strategies employed were:

1. Use private sector resources to fill critical roles and augment agency staff (75%).
2. Add staff to accelerate the acquisition process (55%).
3. Advertise projects before all parcels have been acquired or right of entry secured (50%).

The four least commonly used strategies were:

1. Pay incentives to private sector companies performing acquisition services for your agency (0%).
2. Pay incentives to property owners that agree to sell early in the process (10%).
3. Use of the construction contractor to acquire property after awarding the construction contract (10%).
4. Use of the construction contractor to acquire rights of entry after awarding the construction contract (15%).

Questions 37 and 38 asked agencies to rate the effectiveness of their strategies; a strong correlation exists between what they do and the effort's effectiveness. Clearly, the agencies are doing what they believe is most effective.

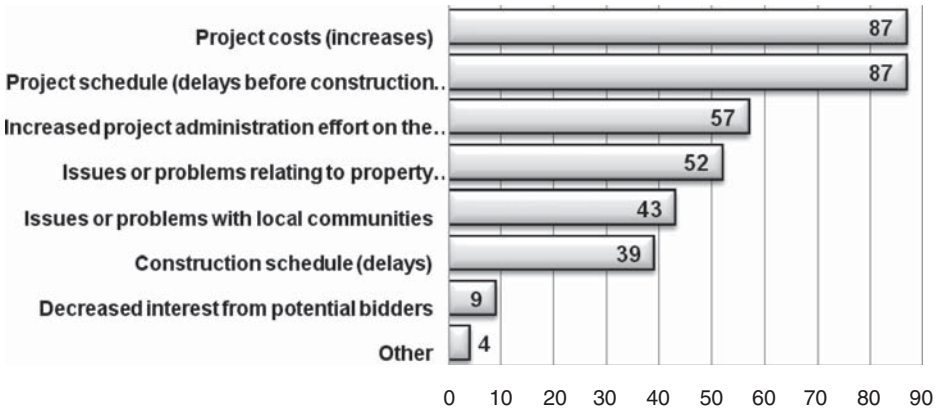

FIGURE 10 How ROW acquisition and activities impact projects (see Question 28). (Owing to multiple choices percentages do not equal 100%.)

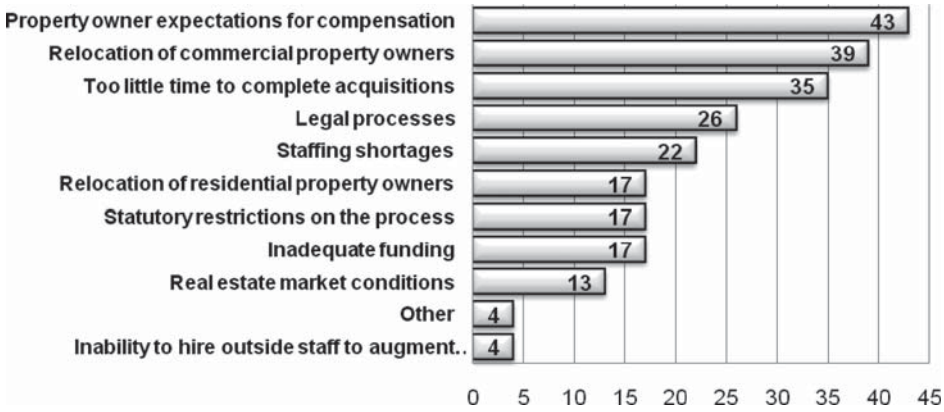

FIGURE 11 Most difficult elements of the acquisition process (see Question 29). (Owing to multiple choices percentages do not equal 100%.)

A final trend noted from the results is that 50% of agencies advertise projects before all the parcels are cleared. Although used frequently, this approach adds risk to the overall delivery of the project and could result in financial and schedule impacts.

The narrative comments in Appendix B offer further insight into how states are dealing with ROW acquisition. From these responses certain themes emerge including:

- Utilization of alternative dispute resolution processes can help move decisions and agreements forward more quickly.
- Seeking early right of entry can help reduce impacts.
- Early involvement of ROW staff is important during design.
- Utilization of outside resources can help to augment in-house staffing.

TABLE 12
AVERAGE TIME REQUIRED WHEN CONDEMNATION IS REQUIRED ON RESIDENTIAL PROPERTY

Average Time	What is the average time to acquire a residential property that does not require condemnation? (% of state response)	What is the average time to acquire a residential property when condemnation is required? (% of state response)
Less than one month	0	0
Two to three months	14	5
Four to six months	43	0
Six months to a year	29	55
More than a year	14	40

TABLE 13
AVERAGE TIME REQUIRED WHEN CONDEMNATION IS REQUIRED ON COMMERCIAL PROPERTY

Average Time	What is the average time to acquire a commercial property that does not require condemnation? (% of state response)	What is the average time to acquire a commercial property where condemnation is required? (% of state response)
Less than one month	0	0
Two to three months	5	5
Four to six months	33	0
Six months to a year	43	35
More than a year	19	60

Some states are trending toward streamlining the acquisition process in the form of administrative settlements and payment of incentives.

Urban projects are definitely affected by the acquisition of ROWs. Most common among the impacts are cost overruns and schedule implications. Owner expectations and the relocation of commercial owners were noted by the agencies as being particularly questionable. In looking at a project schedule and what could delay construction it is clear that once a Record of Decision is in hand that ROW acquisition can become the critical path. Condemnation is the discriminator. If a residential property goes to condemnation, 95% of these parcels take at least 6 months to acquire and 40% more than year. In the case of commercial property, 60% take more than a year to clear. Adding staff, either in-house or from the private sector, are the two most common strategies to combat the schedule impacts of the acquisition process. Although a great deal of effort is made to secure all of the ROWs for a project before advertisement, 50% of the agencies noted that they do move ahead to construction without 100% of the parcels cleared.

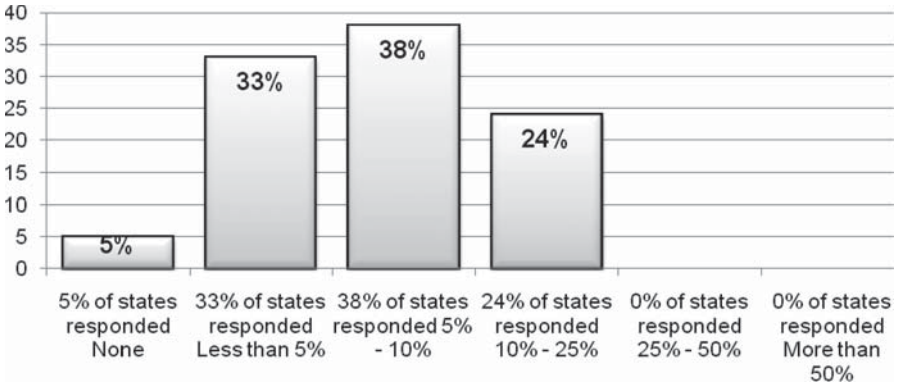

FIGURE 12 Percentage of residential properties requiring condemnation on urban corridor projects (see Question 32).

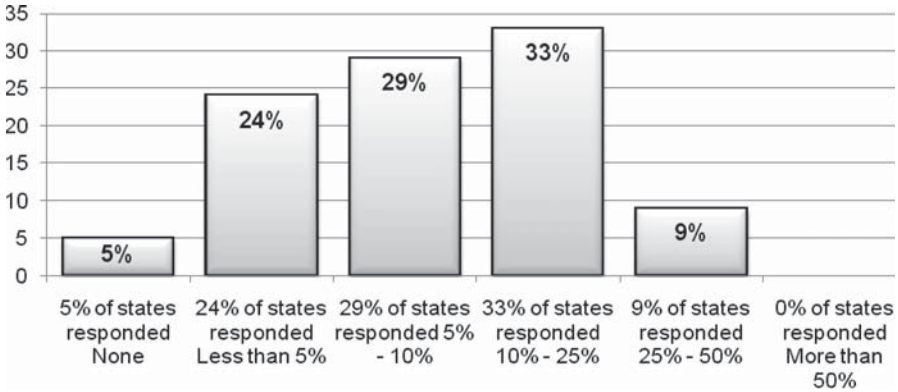

FIGURE 13 Percentage of commercial properties requiring condemnation on urban projects (see Question 35).

TABLE 14
RIGHT-OF-WAY ACTIONS BY STATES

ROW Action by State	Which of the following strategies does your agency employ to deal with right of way issues relating to construction projects in urban corridors? (% of state response)	Of the options listed in Question 36, which do you find to be the most effective in dealing with the impacts of right of way acquisition on the urban corridor projects constructed by your agency? (% of state response)	Of the options listed in Question 37, which do you find to be the least effective in dealing with the impacts of right of way acquisition on the urban corridor projects constructed by your agency? (% of state response)
Use private sector resources to fill critical roles and augment agency staff	75	61	8
Add additional staff to accelerate the acquisition process	55	55	0
Advertise projects before all parcels have been acquired or right of entry secured	50	44	15
Award projects before all parcels have been acquired or rights of entry secured	35	6	54
Other	30	56	0
Use of the construction contractor to acquire rights of entry after awarding the construction contract	15	0	38
Pay incentives to property owners that agree to sell early in the process	10	6	0
Use of the construction contractor to acquire property after awarding the construction contract	10	6	38
Pay incentives to private sector companies performing acquisition services for your agency	0	0	15

Owing to multiple choices percentages do not equal 100%.

CHAPTER SIX

STAKEHOLDER AND PUBLIC INVOLVEMENT

Two areas relating to public involvement and the media were explored in the course of this study effort. The first, covered in this chapter, relates to how the agencies engaged their stakeholders and advanced the typical public involvement activities. The second area, dealing with media relations, is included in chapter seven.

BACKGROUND

Stakeholder issues and public involvement increasingly have become a major component of urban projects across the country. The United States has become a nation of instant communications, with the Internet, Twitter, Facebook, YouTube, and other means for sharing information real time. Transportation agencies serve a society whose expectations for accurate and timely information have never been higher. Although this societal trend is not unique to urban projects, the need for more and better communication appears higher than for their rural counterparts. This survey analyzed what activities transportation agencies undertook to most effectively address these needs.

WHO SPEAKS FOR THE AGENCY

The first series of questions focused on who spoke for the agencies during construction. Table 15 shows how they responded to whether or not they have a project-specific spokesperson or individual to speak to the public or media on an urban project.

Based on agency responses, one-half reported that they do so "Always" or "Very Often." Respondents indicated that when a project-specific person is not assigned, existing staff with other responsibilities such as those within a central community relations/media office typically handle these duties. The resident engineer who is onsite, but not solely dedicated to public involvement, may also manage handle such communications.

Table 16 identifies the individual who speaks for the agency. The question asked, when a specific person was assigned, were they an in-house employee, or if agencies used consultants for complex urban corridor projects. In most cases, transportation agencies retain this particular "spokesperson" role on urban projects. Anecdotally, agencies appear to indicate a level of trust and confidence in their own employees versus having an "outsider" speak on their behalf. However, 81% of the agencies did use private contractors for this role at least sometimes.

BRANDING

Sometimes urban projects take on a separate identity. Virtually everyone in the transportation industry has heard of T-REX in Colorado. Those in the Indianapolis area are familiar with Super 70 because of a major improvement to that corridor some years ago. I-15 in Utah, the first major DB project constructed by a state DOT, has also achieved a somewhat iconic status.

Urban projects are often so big, with a huge impact on large populations of people, that they become part of life for the affected citizens over an extended period. In some cases, agencies have even branded their work through special logos. The I-64 improvements in St. Louis, completed in late 2009, are a good example of this. This successful project was branded by using the logo found in Figure 14.

Utah also adopted a project logo for a number of its urban projects. The ongoing expansion of I-15 in Utah County, costing in excess of $1 billion and resulting in a major expansion of this critical roadway over a three-year period, has been branded with the logo found in Figure 15.

Surveyed agencies were asked if they specifically branded urban projects, with responses found in Figure 16. Although not uniform, the trend is to do something to identify large urban projects in ways that make them unique for communication purposes.

INFORMATION STRATEGIES

Keeping stakeholders informed throughout a project has become critical during complex urban work. It is a process that has evolved over time and demands sophisticated attention and effort.

The challenge for agencies is not the decision to provide information but how best to do it and reach as many individuals as possible. During the I-15 Reconstruction Project in Salt Lake City in the late 1990s, the author determined that a 30-s television spot on the 10 p.m. news on the leading local station was discovered to be the most cost-effective way to get information to a large audience. It was more expensive than

TABLE 15
PERCENT OF STATES WHO ASSIGN AN INDIVIDUAL TO MANAGE STAKEHOLDER ISSUES ON URBAN PROJECTS

Does your agency assign a project specific individual to its urban corridor projects for the purpose of managing stakeholder issues or public/community involvement activities?	
Options for Answers	% of State Response
Never	4
Sometimes	35
Often	9
Very Often	17
Always	35

TABLE 16
EMPLOYEE VERSUS PRIVATE CONTRACTOR TO MANAGE STAKEHOLDER ISSUES (IN REFERENCE TO QUESTION 40)

Options for Answers	Is this person an agency employee? (% of state response)	Is this person a private contractor? (% of state response 2)
Never	0	13
Sometimes	32	64
Often	23	13
Very Often	27	5
Always	18	0
N/A	0	5

N/A = not available.

FIGURE 14 I-64 project logo (St. Louis).

FIGURE 15 I-15 core expansion logo (Utah).

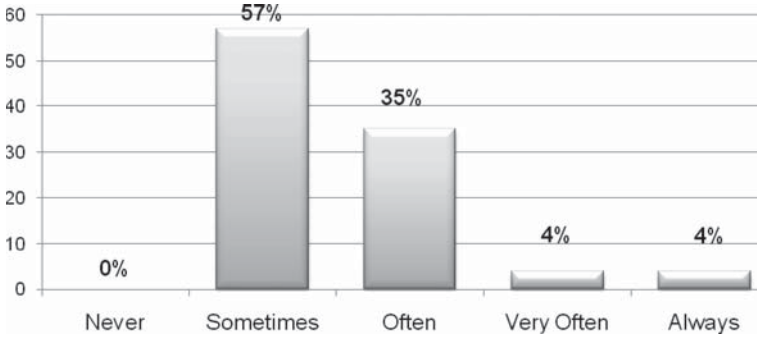

FIGURE 16 Percentage of individual projects "branded" for communication or other purposes (see Question 43).

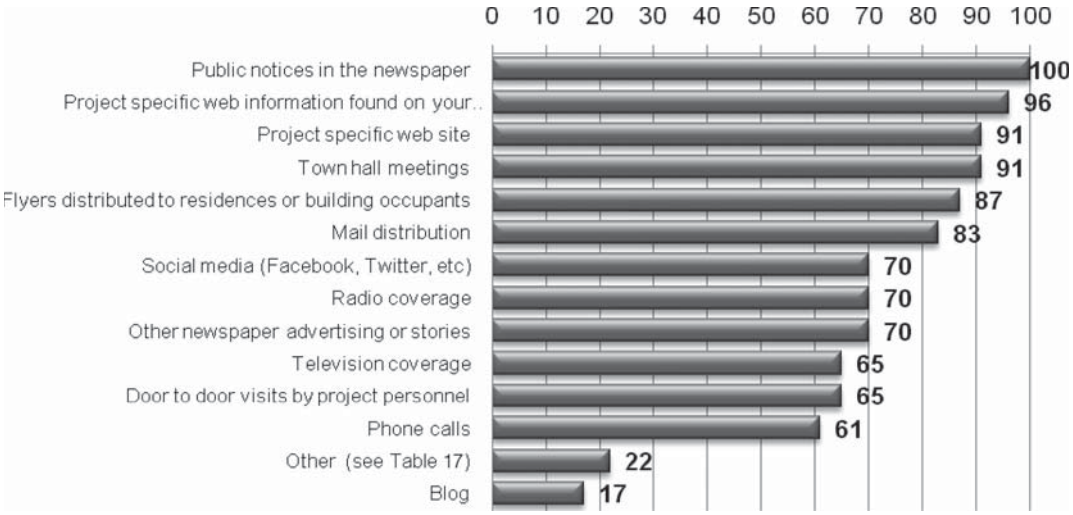

FIGURE 17 Activities used to involve and inform stakeholder groups (see Question 44).

other methods, but the audience was substantially greater than that reached by any other tool; therefore, the "per impression" cost was very low compared with other strategies.

This study solicited feedback concerning which information-sharing processes were most effective for large urban projects. Figure 17 shows how they responded, with additional comments in Table 17.

Of note is the striking uniformity of the responses. This is reflected by the top four activities having at least a 90% rate among the agencies.

Figure 18 then reflects on how these agencies felt about the effectiveness of various communication strategies used. The results presented in the figure illustrate the large array of communication methods with how agencies view effectiveness. Although few consider public newspaper notices as an effective communications tool, legal requirements and tradition perpetuate this tool, which is employed by all agencies. Town hall meetings reflect how public comment has been sought since our nations' early years and are a mainstay of many urban project outreach programs. The second-most effective tool after town hall meetings is that which information stakeholders get from the agency website or a project-specific website. Additional comments from agencies are listed in Table 18.

Further examination of the data in both Figure 18 and Table 18 offers other insights. For example, even though there is strong correlation between the first six activities in terms of use, the first public notices in newspapers are seen as being very effective in the overall process of communicating with stakeholders. There may have been a time when this provided the best possible way to communicate with various interested parties to a project; however, agencies are now finding other means to be more effective. That they persist in dropping fliers on doorsteps is curious because this activity is not seen as useful. This perhaps represents an area for further research.

TARGETING STAKEHOLDER GROUPS

Those unfamiliar with urban corridor construction may not realize it but the list of stakeholders can be usually long. "Stakeholder," when used in the context of complex urban

TABLE 17
COMMENTS FOR QUESTION 44

Public hearings	Illinois
Have news conferences for individual projects	Pennsylvania
Transportation System Management (TSM) meetings	Arizona
Public announcements	Illinois
Mass text message notification	Pennsylvania
Metropolitan planning organizations have e-mail distribution about projects	Pennsylvania
TSM meetings include ADOT, local governments, contractors, media, DPS, and other interested agencies or groups.	Arizona

DPS = Department of Public Safety.

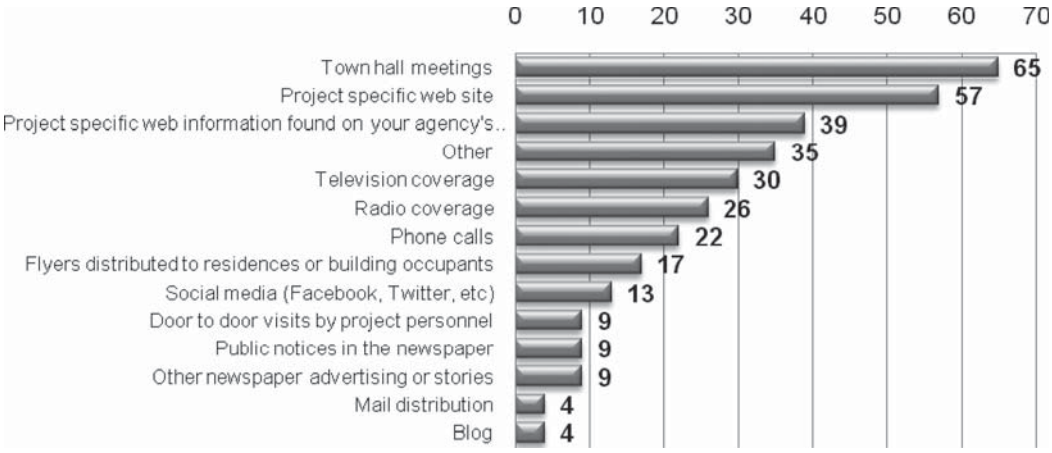

FIGURE 18 Activities found to be effective for involving and informing stakeholder groups (see Question 45). (Owing to multiple choices percentages do not equal 100%)

TABLE 18
COMMENTS FOR QUESTION 45

Focus groups, mass media	Utah
TSM meetings	Arizona
Public announcements	Illinois
Agency currently looking into social media as an outreach strategy	Oregon

TSM = transportation system management.

construction projects, identifies a wide array of groups and individuals. Each group often requires a specific message. When asked if they target specific stakeholder groups, the overwhelming majority of the agencies participating (89%) said they did. Table 19 explores further which groups were targeted for specific mitigation strategies.

The questions asked for this area of the survey may be understood by context and correlation. The first question focused on targeted groups and indicated a "yes" or "no" response. Answers reflect the diversity of stakeholder groups agencies seek for communications purposes.

The second question sought to assess which groups the agencies believe were most important to communicate with during a project. The majority of agencies focused on the following:

- Businesses (78%)
- Residents (70%)

TABLE 19
GROUPS STATE AGENCIES TARGET WITH MITIGATION STRATEGIES—
WHICH GROUPS ARE MOST IMPORTANT

Group	Please check those groups which your agency has targeted mitigation strategies/plans for dealing with their concerns: (% of state response)	Of these groups which are most important to deal with on your urban projects? (% of state response 2)
Businesses	87	78
Residents	83	70
Travelers	61	9
Business deliveries	43	9
Truckers	61	4
Commuters	78	35
Elected officials	74	57
Recreationalists	22	0
Sports fans	52	4
Other	13	0

Owing to multiple choices percentages do not equal 100%.

- Elected officials (57%)
- Commuters or those using the corridor (35%).

Communicating with stakeholders is a complex but essential part of the delivery process for urban projects. Agencies employ a wide variety of strategies to reach out to an increasingly long list of stakeholders. Branding or some kind of unique identifier is used on most projects, with some focusing on the agency and others on a specific project. The list of communication strategies offers a glimpse into the diversity of attempts to get the "message out" to the people affected by the project work. The agencies reflected a strong uniformity in the kinds of efforts they use to communicate with some traditional means such as newspapers and fliers being joined by emerging strategies using the web-based communications. Of interest is that some activities or strategies are frequently used but not seen as being effective by the agencies. Why they persist in their use could be the subject of additional research.

CHAPTER SEVEN

MEDIA RELATIONS

BACKGROUND

Working with the media has become an integral part of large urban construction projects. High daily traffic counts, a public that is constantly exposed to the vagaries of the construction process, and the collateral impacts of the work on the local community almost demand media attention.

Transportation agencies have changed considerably in dealing with the media. For example, 30 years ago the Arizona DOT had a one-person community relations office doing all media work, writing any newsletters that might be published, who was always present to take pictures when awards were given out. Today that person has been replaced by a fully staffed office prepared to deal with today's sophisticated media market. Other state DOTs have taken similar measures given the changing public relations demands.

Twenty-five years ago urban project media work would have been almost an afterthought in the overall construction effort. Today, media relations personnel are an integral part of the project team. Accordingly, this study sought to understand which practices transportation agencies were using while also measuring effectiveness.

WHO SPEAKS TO THE MEDIA

The first issue was the question of who actually dealt with or spoke to the media on large projects. Questions sought to determine who speaks to the media and their employment affiliation. Table 20 reflects how the states responded to each one.

On urban projects the majority (56%—"Always" and "Very Often") uses a specific person to meet with and speak to the media. Only 9% never have such a person. These agencies have the largest capital programs in the country and yet 35% either sometimes or do not have a designated spokesperson. Anecdotally, when no spokesperson or media manager is designated, public relations duties are handled by someone in the agency's central office or fall to the resident engineer or project manager.

In determining whether or not this person is a state employee or private contractor, analysis of the next two questions offers insight but not total clarity. Half the agencies noted that they always use an in-house employee for media management. One might suppose they would never use private consultants if they always use in-house staff. However, only 36% reported never using private sector resources. Research limitations did not fully permit comprehending this disparity. The major points taken from the last two questions are: most agencies use in-house resources to perform this function and, in only a few cases, use private sector consultants. Also, a trend exists where in-house staffing is augmented by outside resources.

MEDIA RELATIONSHIP

If it is a given that the media will be part of virtually every major urban construction job, then it stands to reason that a better understanding of the ensuing relationship with the transportation agency is needed. The next series of questions in the survey explored how the DOTs feel about the media and this relationship. Figure 19 documents these responses. The presentation in this figure, with additional comments in Table 21, shows that 87% of the respondents view the media as at least generally positive. Of that group, 52% view the media as a strong partner. Only 9% view the media as never wanting to provide a positive story. Also, no one said that the media ignores their projects or that the media is suspect.

EFFECTIVE COMMUNICATION PRACTICES

The array of possibilities for communicating with stakeholders is extensive. Not everyone is totally effective nor is there a single approach that will effectively communicate with all groups affected by a project. Figures 20 and 21 and Tables 22 and 23 reflect the responses to which strategies are used the most and that are the most effective.

The results show that the following three practices are most often used when communicating with stakeholders about complex urban projects:

1. We rely on our relationships with key media people to access audiences and get the word out (83%).
2. We rely on the radio to cover our projects when they have time and interest (83%).
3. We rely on television stations to cover our projects when they have time and interest (74%).

TABLE 20
HOW OFTEN IS AN INDIVIDUAL, AGENCY EMPLOYEE, OR PRIVATE CONTRACTOR ASSIGNED TO MANAGE MEDIA

Project Specific Media	Does your agency assign a project-specific individual to its urban corridor projects for the purpose of managing media relations? (% of state response)	Is this person an agency employee? (% of state response)	Is this person a private contractor? (% of state response)
Never	9	0	36
Sometimes	26	23	50
Often	9	9	5
Very Often	17	18	0
Always	39	45	0
N/A	0	5	9

N/A = not available.

The least mentioned three are:

1. We purchase commercial time with radio stations (22%).
2. We purchase commercial time with television stations (26%).
3. Paid "tags" on radio announcements such as traffic reports (30%).

Agencies rely on free access to television and radio over paid messages at a 4:1 ratio.

The final question from this series asked about the effectiveness of adopted strategies. Figure 21 and Table 23 provide the responses. Clearly, it's one thing to employ a strategy and another to influence or inform the public. Agencies rely on relationships with key media people (from Figure 21) and believe this also to be the most effective strategy of all those listed. No other strategies were mentioned as successful by more than 35% of the participating agencies.

To understand how effectiveness of media relations was evaluated, the survey asked about performance measurement practices. Figure 22 shows the responses. Sixty-five percent rely on past experience to make decisions about strategies to use. Public feedback at meetings (39%) and focus groups (26%) were the next most commonly mentioned. Surprisingly, only 17% identified stakeholder surveys as a method for determining if a communication strategy is effective. In an era when

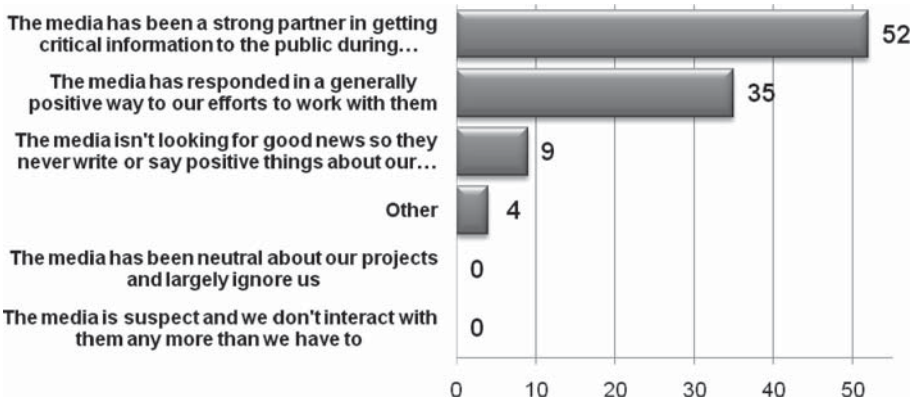

FIGURE 19 Best description of agency's view and relationship with the media (see Question 53).

TABLE 21
COMMENTS FOR QUESTION 53

B	The Community Relations Coordinator and District Press Officer work on these relationships. The media has 24/7 access to the press office. The Department is proactive in keeping them informed so we get fair coverage. Overall, we have a good relationship.	Pennsylvania
B	Overall I think they are positive. Some outlets sensationalize but I dont think they are well respected in community.	Nevada

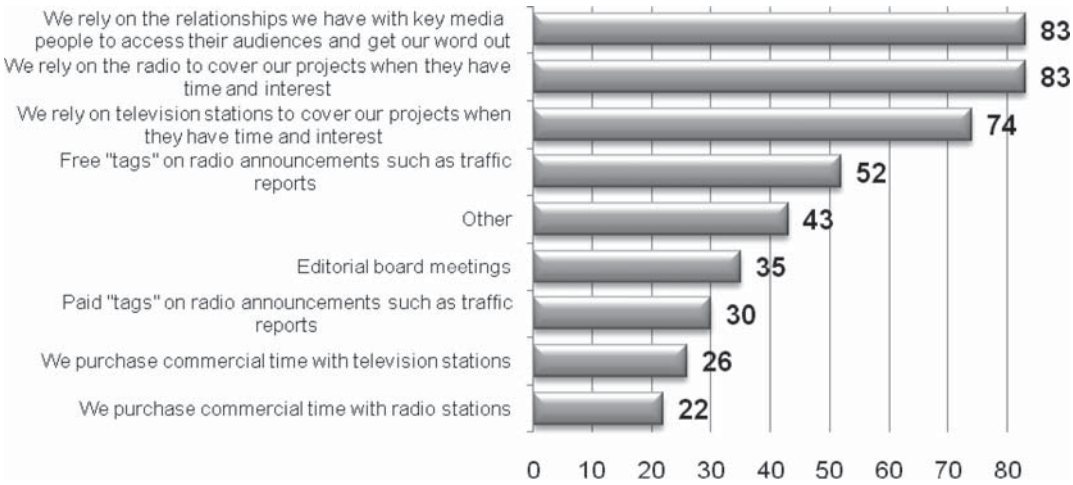

FIGURE 20 Strategies used by the agency to communicate information to stakeholders (see Question 54). (Owing to multiple choices percentages do not equal 100%.)

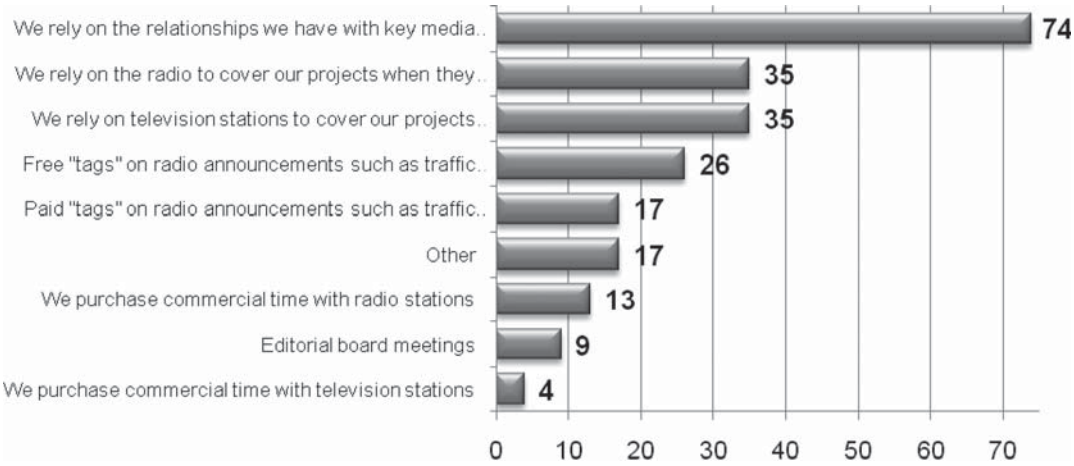

FIGURE 21 Strategies most effective in communicating information to stakeholders (see Question 54). (Owing to multiple choices percentages do not equal 100%.)

TABLE 22
COMMENTS FOR QUESTION 54

Paid news ads to announce public meetings	Oregon
Distribute news releases on major projects	Massachusetts
Aggressive press releases, media tours	Washington
Community meetings	Illinois
PSA when available, social media activities, pitching feature	Michigan
Website	Tennessee
Public press releases	Pennsylvania
Press releases	Nevada
Cable TV within the project area(s), community	Michigan
Additional signs in the project work zone with website information	Pennsylvania
Provide free access to traffic video cameras	New York
Reached out to minority groups through Spanish language ads, minority news publications including bidding opportunities	Oregon
Very heavy use of media relations to keep our topics on construction projects in the news	Georgia
Traffic information is supplied to the radio and TV from the Traffic Management Center	Pennsylvania

PSA = public service announcement.

TABLE 23
COMMENTS FOR QUESTION 55

Unknown	Illinois
Social media techniques, project managers broadcast/print interviews	Michigan
Website	Tennessee
Video cameras	New York
Not sure	Louisiana
Not sure	Nevada

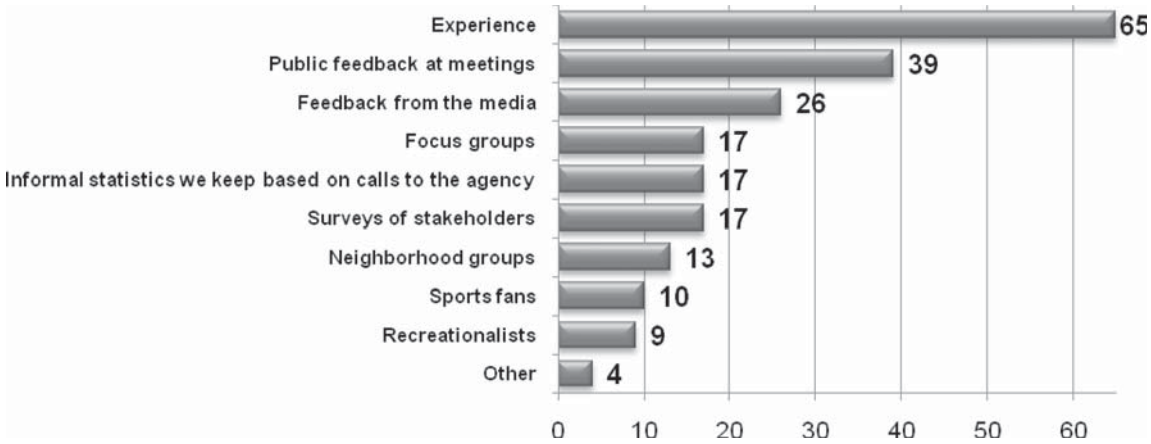

FIGURE 22 How agencies know the effectiveness of media strategies (see Question 56). (Owing to multiple choices percentages do not equal 100%.)

performance measures and specific metrics are being examined for a multitude of activities in the transportation arena it is interesting that so little measurement is used to assess these strategies.

In reviewing the narrative responses Oregon mentioned that social media is being examined. Arizona involves the public in Traffic System Management efforts. E-mail, focus groups, and mass text messaging were also mentioned.

Using the media relations and an effective strategy for using the media to communicate with stakeholders is an important element of urban projects. Agencies are relying on their own staff to be the "up front" person dealing with the media, but sometimes using outside resources to assist in those efforts. Fifty-two percent of the agencies reported a strong relationship with the media that reflects a deliberate effort to establish that connection. The majority (83%) rely on this relationship to further the messaging or communication strategies relating to their urban projects. Ultimately, this approach reflects a healthy professional relationship and respect that should exist for a positive outcome on these projects. A particularly interesting point is the lack of metrics and specific data being used to manage and make decisions relating to use of the media for urban project communications.

CHAPTER EIGHT

MULTI-MODAL

One attribute of constructing projects in urban corridors is that often multiple modes are present in the same or proximate ROW. This can be a benefit when the other modes siphon off vehicles or riders and relieve pressure on the rest of the corridor. On the other hand, the presence of other modes can complicate work zones, traffic control, productivity, costs, and schedules.

Transportation agencies participating in the survey reported that 69% of their projects either "Always," "Very Often," or "Often" have other modes present in the project ROW. This frequency demands action to address such unique challenges. Figure 23 reflects these data and other findings for this question.

If other modes are present in the same corridor, then agencies will most likely have to address specific issues during construction. Among these are:

- Geometric conflicts
- Operational issues during construction
- Operational issues after construction is completed
- Construction impacts
- Dealing with multiple agencies or organizations
- Budgetary constraints present in other agencies or organizations.

What measures are taken to address the operations of these other modes before construction begins is important. Figure 24 shows how the agencies responded.

Note the four most commonly used measures are:

- Coordination with other modes during the engineering design process (87%).
- Coordination with other modes during the planning process (83%).
- Project-specific meetings/committees with transit agencies (83%).
- Project-specific meetings/committees with bicycle and pedestrian groups (65%).

Early coordination during the planning and design phases is a strategy that most agencies use to address the impacts of sharing the ROW with other modes when improving urban corridors.

If other modes are present in the ROW or adjacent to the urban corridor under construction then leveraging that proximity to carry some traffic would appear to be a good idea. Certainly, much depends on the nature of the project, the alternative modes that exist, operational issues, the flexibility of the alternate modes to adjust services to accommodate construction changes in the corridor, and various public policy issues such as available funding. Ultimately, in spite of the apparent logic in leveraging multiple modes in a single corridor, it actually does not happen very often, as shown in Figure 25.

Only 9% of the responding agencies reported that diverting volume to other modes was effective, whereas the majority only found some effectiveness in doing so. The "Never" and "Sometimes" responses were provided 69% of the time, reflecting a low level of reliance on other modes to accommodate mobility needs during construction.

Managing traffic through an urban project is a high priority for transportation agencies. This being the case, if agencies found value in using the other modes to help them divert traffic to alleviate congestion then they would do so more aggressively. Part of the reason this may be an issue is the relatively low level of ridership or usage that transit, pedestrian, and bicycle modes have in urban corridors in the first place. For example, if current ridership on transit in a corridor is 2% to 3% of all users, and this volume doubles during construction, the resulting numbers are still very small and barely relevant to the overall travel through the corridor. Of note is that even with this limited impact on urban construction projects the agencies still overwhelmingly identified coordination with other modes before and during construction as important activities they engage in.

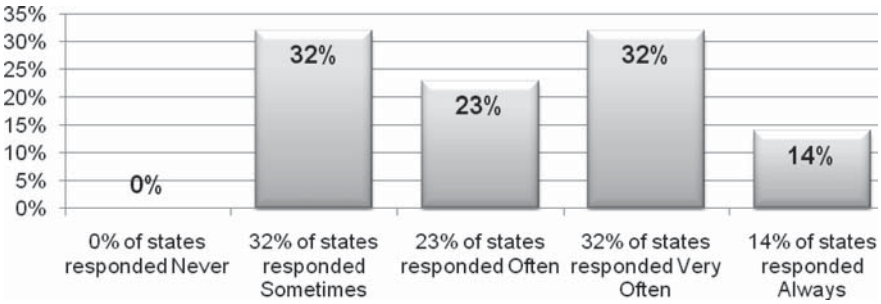

FIGURE 23 Frequency of other transportation modes present in projects (see Question 58).

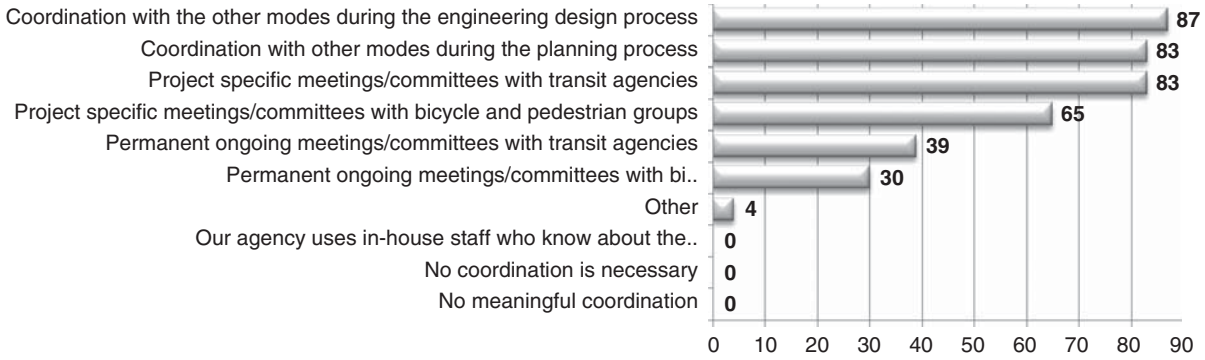

FIGURE 24 Measures taken to address other modes prior to construction (see Question 59). (Owing to multiple choices percentages do not equal 100%.)

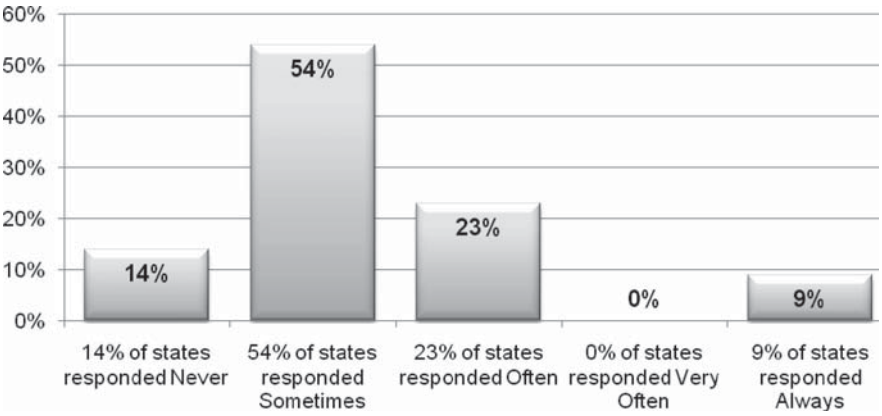

FIGURE 25 Reliance on other modes for assistance (see Question 60).

CHAPTER NINE

TRAFFIC MANAGEMENT

Managing the substantial volumes of traffic found in these urban corridors is, perhaps, the most perplexing problem for agencies. Sometimes alternative corridors exist to which traffic can be diverted; traffic movement also can be facilitated by other means in spite of the major impacts of actual construction. The activities employed by transportation agencies that assist them to effectively manage traffic during construction are relevant to this report.

The first query in the survey asked respondents to list strategies used to manage traffic during construction. Figure 26 provides this information (see additional agency comments in Table 24).

What is striking when analyzing these results is the uniformity of the responses. The top six strategies had over 80% use rates among the states. The second tier of responses, those ranging from 57% to 74%, included six additional approaches. Thus, the top 12 strategies have a usage rate of at least 57%.

The agencies provided many useful insights into how they approach this critically important activity of urban construction. A short summary of responses provided here illustrates this point:

- Ninety-one percent of the agencies used a traffic management center.
- Oregon uses a traffic management plan and a web-based work zone traffic analysis tool.
- Colorado makes use of all the strategies found in Figure 26.
- Washington State—one focus area is heavy outreach to local communities and media before a significant closure.
- Michigan deploys temporary ITS devices, tying them into its permanent system so that they are integrated into its broader management efforts.
- Missouri extensively uses customer surveys to assess performance and change activities accordingly.
- Pennsylvania uses rolling road blocks as motorists approach work zones.
- Several states, including Louisiana, Georgia, and Minnesota, shorten construction time to reduce the duration of traffic impacts.
- Traffic management plans are produced by contractors in Utah, thus allowing them to sync construction approach and activities.
- Nighttime closures are used by many states.
- Indiana considers project phasing to reduce the amount of temporary pavement and construction phase changes.

Management of traffic during the construction of urban projects can be challenging under the best of circumstances. High-traffic volumes make the work difficult to manage. The agencies surveyed have identified practices that are common in the industry that have been developed and matured over many years of experience. The uniformity of application of these strategies is noteworthy.

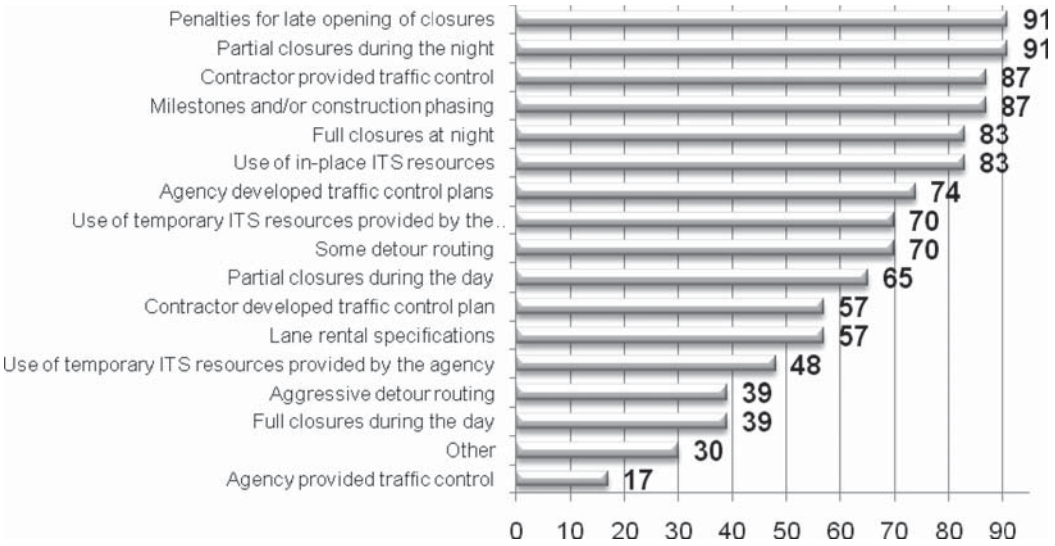

FIGURE 26 Strategies for managing traffic during construction (see Question 63). (Owing to multiple choices percentages do not equal 100%.)

TABLE 24
COMMENTS FOR QUESTION 63

Motorist assistance patrols	Louisiana
Have utilized full or significant closures for extended periods. Heavy media push required prior.	Washington
Full weekend closures	Oregon
Weekend work	Tennessee
Contractor has a traffic control person, who is on call 24/7.	Pennsylvania
Contractor provides full-time traffic control coordinator to monitor traffic inside the project ensuring safety and mobility	Arizona
TMP working group made up of all area agencies and stakeholders to plan and monitor traffic management.	San Francisco
Off-duty uniformed police at traffic signals and along detours.	Pennsylvania

TMP = traffic management plan.

CHAPTER TEN

CASE STUDIES

To more specifically understand how states manage urban construction contracts, four case studies were examined in detail. This chapter focuses on the details of these four projects.

INDIANA—SUPER 70

The Indiana DOT (INDOT) has tried various strategies to deal with construction in urban corridors in the Indianapolis metropolitan area. One of those efforts was the Super 70 Project, which involved totally reconstructing 5 miles and eight lanes of Interstate 70. This $160 million project was completed in 9 months. Much of the effort to complete this project involved managing congestion, because the average daily traffic in this corridor was in the range of 170,000 vehicles. Walsh was the contractor on this DB project, and American Structure Point, Janssen, and Spaans were the engineers.

Specific strategies employed by INDOT included:

- One of the challenges that could have delayed the project was a railroad crossing. INDOT engineers saw the potential impacts of making major changes to the railroad itself. Consequently, they redesigned the railroad crossing to avoid major impacts and delay. This happened during preliminary engineering so that it would not interrupt construction.
- Interstate 70 traverses Indianapolis as a key east–west corridor, with value regionally as well as nationally in terms of freight movement. On any given day truck traffic accounts for 20% to 25% of all traffic along this corridor. To accommodate the accelerated construction sequence and provide the optimal work areas for the contractor, lanes were narrowed below the standard 12-ft width. With lanes narrowed during construction, it was imperative that truck traffic be reduced as much as possible. To do this the agency sought a change in legislation that allowed them to force trucks to I-465 as a detour and levy large fines for those who failed to comply. This diversion was effective and significantly alleviated traffic in the corridor during construction.
- Optimizing throughput in the corridor was essential to managing congestion and public impacts during construction. In addition, the accelerated approach stipulated in the contract allowed the state and contractor to manage merges on and off the freeway. Ultimately, the traffic control plans called for closing many exits, with only a few on-ramps and no off-ramps opened. This allowed traffic to move more freely through the corridor and eliminated many of the weave movements typical of this setup.
- Business access was a concern in the planning phase of the project and INDOT took deliberate steps to minimize the impacts they would experience during construction. The agency spent considerable time working with adjacent businesses to make sure the public would still be able to reach these properties. A combination of public information and communications with the business owners resulted in a successful relationship between the state and the important stakeholders. In the end, INDOT found that these efforts allowed the businesses along the project length to flourish when the opposite could have been true.
- Managing the remaining capacity during construction was paramount to the success of the project. With lane restrictions and on- and off-ramp movements significantly impacted, finding ways to maximize capacity became imperative. In the planning process, the use of movable barriers to change the flow in one freeway lane to accommodate the directional split was determined to be a sound approach. The proof was in its successful application to the benefit of the users in the corridor.

In all, Super 70 was a great success for the state and the traveling public. It showed how careful planning and thoughtful execution of the plan all contributed to a great project.

MISSOURI—THE NEW I-64

The Missouri DOT (MoDOT) delivered one of its most significant projects in many years by rebuilding 11 miles of I-64 in St. Louis from west of Spoede Road to east of Kingshighway Boulevard. The contractor joint venture was called Gateway Constructors and consisted of a joint venture of Granite Construction Company, Fred Weber Inc., and Millstone Bangert Inc., with Parsons Transportation and URS as design engineers. MoDOT administered the project with in-house staff. Work started in March 2007 and the project was finished in December 2009. Project work items included 12 traffic interchanges, new portland cement concrete pavement, drainage features, sound walls, connector roads and streets, and other typical urban work.

This $535 million DB project advanced several innovative project approaches worthy of use elsewhere in the country. The following include noteworthy project attributes:

- Management support for the project was evident from the beginning. Pete Rahn, then Director of MoDOT, along with other key members of the management team gave unqualified support to the project and staff.
- The project allowed for closing the corridor in two halves to accommodate speedier construction. Milestone incentives and disincentives were established around opening both the east and west halves of the project. The east half was closed from January to December of 2008, with an incentive of $2 million tied to the on-time reopening. The west half had a similar incentive if completed by December 2009. In both cases, the contractor achieved this goal. Actually, the project was completed approximately a year ahead of the overall schedule. Many members of the project team associate this schedule gain with the ability to close down the east and west halves of the project to create highly efficient construction work zones to accomplish the work. This also reduced the number of traffic closures that would have been required had the complete corridor remained open during the whole project.
- Incentives were not just focused on the early or late completion of the project. MoDOT believed that the contractor needed a greater stake in the overall success of the agency's efforts to address the mobility needs of the region during construction. Consequently, $1 million in incentives were offered to the contractor's work to promote regional mobility during the contract. Actions assessed by MoDOT to determine payment of this amount included traffic signal timing, signage, detour management, and context-sensitive mobility issues. Strong collaboration was required to make a difference in regional mobility, and the resulting joint efforts paid off with high levels of acceptance by the public of the inconveniences precipitated by the construction work itself. The full amount of this incentive was earned as well.
- A strong public information team was formed with Linda Wilson and Dan Galvin leading the effort from MoDOT and Gateway Constructors, respectively. The respective staffs were co-located and operated in a seamless manner. Responsibilities were divided without regard for who represented which organization and many innovative public information strategies were implemented. The transparency of affiliation for Linda and Dan is noteworthy and reflects how well they worked together. Extensive use of the media, public interactions, very deliberate stakeholder management, and responsiveness created a strong advocacy in the community for the project. In addition, it was realized that stakeholder relationships were an evolving effort, with messages and strategies fine-tuned throughout the project.
- A unique approach to the project delivery methodology included a revision to the normal DB process. In this case, MoDOT determined that its budget was fixed but desired that proposers offer their very best value for the available dollars. Sometimes referred to as "fixed price, variable scope," this approach stipulates the amount of money available and then encourages the contractors to propose as much scope as possible. In this case, MoDOT believes they received more value for their budget than if they had used a more traditional procurement approach.
- During the Environmental Impact Study process, a five-year period, the project manager, Lesley Hoffarth developed relationships with all of the stakeholder groups. She was then able to leverage and service these same relationships during the course of almost three years of construction. The trust developed before construction benefited project staff during intense periods of disruption to the traveling public during the actual work.

The New I-64 Project stands as an exemplar of the use of many key strategies for successful urban construction. Optimizing work zones, effective stakeholder management, early planning, and effective execution of those plans as well were all keys to their success. DB is also given credit by the team for many of the innovations that brought value to this important project.

NEVADA—US-95 WIDENING

In the Las Vegas metropolitan area, the Nevada DOT (NDOT) has a most challenging urban environment for significant transportation construction projects. Traffic volumes never seem to decrease, property values are high enough that the cost of purchasing ROW can be a major impediment to advancing any project, and business interests have a strong say in how work is managed. The US-95 widening project was constructed under these circumstances and was successful in many ways.

This project was one of six in this corridor and was designed to widen the freeway from 6 to 10 lanes and add a high-occupancy vehicle lane in each direction from I-15 to Warm Springs Road. Frehner was the contractor, with PBS&J as the state's General Engineering Consultant. The contract format was DBB. Interesting aspects of this project that could be considered by other agencies included:

- NDOT used penalties to ensure on-time pick up of traffic control after night closures were completed owing to heavy commute volumes. It understood the impact of a late "pick up" and wanted the contractor to be sensitive to this facet of commuting in the Las Vegas area.
- NDOT learned much about project scheduling. In the planning process the state took into account many of

the factors that influence the project schedule as they worked to determine the duration of the project. They recognized that urban construction demands that work proceed in a different manner than other typical projects. Everything from jobsite access, work hours, delivery of materials, limited work zones, and other constraints all influence the contractor's ability to prosecute the work and complete the project. In addition, work activities take more time and require different organizational efforts than previously experienced. These factors must be taken into account so that such contract matters as liquidated damages, incentives, completion dates, and milestones can be properly established. Thoughtful analysis of all these factors led NDOT to a better understanding of the schedule. Time spent planning paid dividends during construction that would not have otherwise been available.

- NDOT bid this project as an A+B contract, meaning that in addition to price, a time component was associated with picking the successful bidder. One lesson learned was that they found their schedule for the maximum number of days to be so tight that the two firms bidding the project both selected the maximum number as the "B" component of their bid. NDOT ultimately derived no schedule benefit from the "B" component of the bidding process, owing to the extremely tight end date selected by the agency coupled with the work complexity. This result has caused them to assess their project impacts analysis previously mentioned and will assist them to further refine those efforts to gain a greater benefit on future projects.

Constructing a project in an urban area such as Las Vegas brings with it virtually every challenge possible for such a project. High-traffic volumes, stakeholder issues that influence daily decisions, exorbitant ROW expenses, and many other factors make this work difficult under the best of circumstances. NDOT did considerable planning leading up to the contract letting, but concedes it learned lessons about project scheduling and how that may or may not influence the procurement of their successful contractor.

DALLAS HIGH FIVE

The Dallas High Five project represents a variety of innovative approaches to the construction of a complex freeway interchange under some of the most challenging conditions in the country. This DBB project consisted of the reconstruction of the interchange between US-75 (North Central Expressway) and I-635 (Lyndon B. Johnson Freeway). The original three-level facility was rebuilt to a five-level configuration to accommodate the average daily traffic of 500,000 that pass through the interchange. Valued at $262.9 million, it was the largest single contract ever awarded by the Texas DOT (TxDOT) at that time.

The innovative strategies adopted by TxDOT for this project reduced the overall construction time frame from ten years to five, with the resulting benefits accruing to the state, the contractor, and, most importantly, to the stakeholders on the project. A number of the state's innovations deserve mention:

- This contract was originally intended to be divided up into five smaller projects and bid in succession as the schedule allowed. As a result of the compact nature of the job site it was going to be necessary to delay the award of successive contracts to avoid impacts and conflicts that would impede the work of adjacent contractors. By going to a single large contract, TxDOT was able to avoid the conflicts inherent with the smaller successive projects.
- One of the reasons that TxDOT was able to construct the Dallas High Five as one contract was an innovative project financing strategy. On past projects the state would set aside sufficient funding in advance for each project and the use of such a practice would have precluded a single large contract owing to cash flow limitations. However, by creating a cash flow model that matched available funding to the work being performed, the Dallas District was able to create a plan whereby a single contract could be awarded and then paid according to the finance plan. TxDOT found savings in overall time, reduced costs owing to contract conflicts, and value from economies of scale resulting from going to the single contract.
- A unique element of the project consisted in the delayed start to the actual construction. The project was awarded in April 2001, but the notice to proceed for construction was not issued until January 2002. It was referred to as the "delayed-start" clause. What this did was provide an extended mobilization period where the contractor could prepare its forces and equipment for the intense period of construction that lay ahead. During this time the contractor performed alternative design work and was able to bring innovations to the bridge design and erection process that saved additional time on the contract. This would not have been possible without the extra time allowed for mobilization. Although it may appear counterintuitive to give more time to save overall time this is exactly what TxDOT did. They credit much of the success of the project to his particular contract clause.
- TxDOT adopted the "windowed milestone" concept for specific portions of the project instead of a specific date for completion of the work. A "windowed milestone" offered the contractor a specific amount of time to complete the work, but did not stipulate when the work would occur. In doing so they gave the contractor the flexibility to schedule and stage its work in an efficient manner. TxDOT believes that this strategy ultimately reduced the amount of time construction was occurring in front of businesses and thereby significantly mitigated the construction impacts.

- Lane rental was another strategy used by TxDOT for this project. In the contract documents the state offered the contractor the opportunity to close lanes and other elements of the roadway for periods of time with values assigned to each. The contractor could then plan its work according to the cost of the impact on the public, with the rental values varying depending on the time of day. TxDOT reported that this strategy resulted in 30% of the work being performed at night when traffic volumes were less and the impact on the public reduced.

The Dallas High Five project is an excellent example of how a transportation agency can implement new tools and even some more seasoned strategies to accomplish positive outcomes in a complex work environment. They are now using many of these same approaches on projects elsewhere in the state.

These four case studies offer a more detailed glimpse into how agencies are using specific strategies to advance their projects and mitigate the normal impacts inherent in urban projects. As noted, no single approach is going to solve all of the problems on a given project but the thoughtful application of old strategies that have been successful in the past and the use of new and innovative tools can bring substantial benefits to everyone involved. Tailoring the tools to the projects is the key to their value and the overall success of the effort (*35*).

CHAPTER ELEVEN

CONCLUSIONS

Construction in highly congested urban corridors is challenging even under the best of circumstances. Traffic volumes are often measured in excess of 100,000 average daily traffic, right-of-way (ROW) acquisition issues are complex and time consuming, and the list of utility conflicts and relocations is often long and difficult to manage. Additionally, media coverage is typically very focused, adding a measure of visibility not present on other projects, and a variety of stakeholders are impacted. Combining all these elements requires pursuing the construction process in ways that are innovative and effective, and which lead to project completion in accordance with project goals.

This study gathered information on what transportation agencies are doing to accommodate the impacts associated with building urban projects. The outcome is a long list of effective strategies that, once implemented, are bringing about measurable success.

Most urban projects do not fall into the "mega-project" category; they are valued at $100 million or less. Typically, design-bid-build is used as the contracting methodology. Many strategies address the unique aspects of urban construction including special contract provisions, milestones, and incentive and disincentive programs.

The agencies identified utilities as a major area of concern, with the potential for significant financial and schedule impacts on urban construction projects. It is clear that utility impacts be planned for and dealt with. They are proactive in efforts to prevent even more schedule or cost issues than already occur, with early and ongoing coordination being the keys to mitigating utility impacts. Early coordination is one key that lessens potential impacts. None of the agencies believed the influence or issues relating to utilities could be totally eliminated.

This study showed that urban projects are usually affected by the acquisition of ROWs. Cost overruns and schedule issues are the most common influences. Condemnations are frequent and delays are often the outcome. It is not unusual for the acquisition of ROWs to be on the critical path for project delivery. This study showed that if a residential property goes to condemnation that 95% of the parcels take at least six months to acquire, with 30% of the parcels taking more than a year to be cleared. In the case of commercial property going through condemnation, 53% take more than a year to clear. Agencies have added staff to mitigate the impacts associated with ROW acquisition. Under ideal conditions, all property is cleared and available for access before construction begins. However, of the agencies surveyed, about half noted that they do move ahead to construction without 100% of the parcels cleared.

Stakeholder communication is an essential part of every urban construction project. The list of stakeholders can be complex and messaging must be adjusted to meet the specific needs of each group. This study found that one effective strategy for identifying a project is through branding. Branding gives a project identity and assists in communicating key information to the public. Communication strategies vary from project to project; however, some specific activities remain constant from project to project. A transition is occurring in the industry as a consequence of society's changing needs and methods for communicating. Although newspapers and fliers are still common, the emergence of web-based tools and platforms is growing significantly. Of interest is that some activities or strategies are frequently used but not seen as being effective by the agencies.

The use of the media and its involvement in urban projects is accepted as a routine part of these projects. Although agencies typically rely on an internal public relations practitioner to be the "face" to the media, instances exist where an agency has hired an outside contractor or consultant to support internal staff in fulfilling this role. Although one would expect the agencies to see the media in an adversarial role, this did not prove to be true in this study. One-half the agencies reported a strong relationship with the media. In addition, the majority (80%) rely on strong relationships with the media to further the messaging or communication strategies relating to urban projects. This situation reflects a healthy professional relationship and respect that must exist for a positive outcome on these projects. One surprise was the absence of metrics and specific data that could be used to manage and make decisions relating to use of the media for urban project communications.

In theory, it would appear logical that these projects leverage all available resources to mitigate traffic impacts during construction including using other modes as a means for diverting users from their vehicles. This study found that such efforts to use other modes to be limited in their use and ultimate value. On the other hand, agencies reported a clear pattern of early involvement of other modes in their planning processes as well as project-specific efforts to at

least coordinate how other modes are impacted by the construction work itself.

Traffic management is at the core of every urban project, because high-traffic volumes make it a necessity. Striking commonality exists in the strategies used to mitigate high average daily traffic impacts within project limits. Most organizations use standard closure practices, schedule constraints, incentives, disincentives, and other common tools to accomplish this purpose. Proven approaches continue to be used with success and satisfaction among the agencies.

Four case studies were presented that offered more detail about specific project attributes. Many of these attributes emerged in the study in some manner. Among the significant findings from the case studies is how the agencies have tailored the tools to fit the specific circumstances of each given project, further evidence that the suite of available tools is not to be applied randomly or without thought or consideration but with a deliberate focus on outcomes and impacts. Overall, these examples provide additional insights into beneficial "real life" application of some interesting initiatives.

Finally, it is clear that no single answer deals with all the issues facing transportation agencies during project construction in urban areas—even within the same agency. However, using the strategies found in this report may bring meaningful benefits to capital projects across the country.

There is much more to be learned about project delivery in urban areas. Specific performance measures for the different strategies would be useful to quantify potential benefits. The lack of performance data relating to public outreach methods and their effectiveness speaks to the need for greater use of metrics in decision making in this particular area alone. A methodology that would help the agencies bring a cost-benefit analysis to the decision-making process would be useful and assist in selecting the right application or strategy for a given situation. These areas present opportunities for future research into this important subject area.

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APPENDIX A

Survey Questionnaire

NCHRP Project 20-5
Synthesis Topic 41-09
Techniques for Effective Construction of Highway Projects in Congested Urban Areas
Survey Questionnaire

The National Academy of Sciences (NAS), through the Transportation Research Board (TRB), conducts studies relating to contemporary transportation issues. The National Cooperative Highway Research Program (NCHRP) of TRB was established to fund and execute these research projects and publish these reports. As part of this on-going research program it has become clear that transportation agencies are facing more and more challenging situations as they construct important road and highway projects in congested urban areas. Many transportation agencies are seeking solutions to the vexing problems associated with these projects including right-of-way concerns, utility relocations, high traffic volumes, sensitive stakeholder issues, environmental commitments, and many more.

This survey is intended to solicit valuable input regarding how your agency is handling a variety of project implementation challenges and how you are finding success in doing so. This research is being conducted by Tom Warne and Associates, who is under contract to NCHRP to perform this work. Surveys have been sent to all state DOTs with urban areas that are larger than 1,000,000 residents. In addition, the survey has been sent to selected large cities that are facing similar issues on their urban corridors.

INSTRUCTIONS

This survey will take approximately 30 minutes to complete. It must be completed at one sitting. Please answer the questions to the best of your ability. If in doubt, just give us your best answer. The questions have been designed so that you will not have to go get additional information or run reports to provide the answers sought. You should be able to answer each one based on your knowledge of what your agency does on these projects. You already know the answers to these questions—we just need you to respond to each one based on what you know. Your participation in this research effort is greatly appreciated.

If you have any questions about this survey, how the data will be used, or the final report for this project please feel free to contact the Principal Investigator, Thomas R. Warne, PE of Tom Warne and Associates. His contact information is as follows:

Thomas R. Warne, PE
Tom Warne and Associates, LLC
9874 S. Spruce Grove Way
S. Jordan, UT 84095
801-302-8300 (office)
801-541-2619 (cell)
E-mail: twarne@tomwarne.com

Section 1—Background Information

1. Agency name:
2. Agency address:
3. Your name:
4. Your phone number:
5. Your e-mail address:
6. Your position:
7. How many years have you been with your agency?
    a. Less than 1
    b. 1–5
    c. 6–10
    d. 11–20
    e. More than 20
8. How many years have you been in your position?
    a. Less than 1
    b. 1–5
    c. 6–10
    d. 11–20
    e. More than 20

Section 2—Capital Program Characteristics

9. What is the size of your agency's annual capital improvement program?
    a. Less than $100 million
    b. $101–200 million
    c. $201–500 million
    d. $501 million—1 billion
    e. More than $1 billion
    f. Comments:

10. Construction work in congested urban corridors can take many forms. Please identify the kind of work your agency does on your urban corridors. (Check all that apply.)
    a. Improvements on urban arterial streets with only some access control
    b. Improvements on urban arterial streets with aggressive access control
    c. Improvements on controlled access highways
    d. None of the above
    e. Comments:

11. If you had to identify a trend in the project types most often constructed on the urban corridors by your agency, which of the following would be the most prevalent? (Check all that apply.)
    a. No discernable trend
    b. Minor non-pavement or safety improvements [landscaping, Intelligent Transportation System (ITS), sign replacement, signal synchronization]
    c. Minor pavement and safety rehabilitation (pavement rehabilitation or overlay, minor improvement to safety features)
    d. Major pavement and safety rehabilitation [pavement replacement, major improvements to safety features (e.g., barrier replacement)]
    e. Major reconstruction including new capacity, pavement replacement, new structures
    f. Other—Please specify:
    g. Other—Please specify:
    h. Comments:

12. Has your agency taken any special measures to address the issues associated with constructing projects in congested urban corridors?
    a. Yes
    b. No
    c. Not sure
    d. Comments:

13. Are these special measures taken as individual project measures or are they programmatic? (e.g., Are you using acceleration programmatically or on a project by project basis?)
    a. Individual projects
    b. Programmatic
    c. Describe any programmatic measures taken:

14. What types of actions has your agency taken to address the issues associated with construction of projects in congested urban corridors? (Check all that apply.)
    a. No actions
    b. Organizational or structural changes in your agency
    c. Changes in staffing (e.g., additional staff, staff reductions, hiring individuals with different skill sets, etc.)
    d. New or different equipment
    e. Different contracting methods (e.g., design-build, job order contracting, CM/GC, A+B, etc.)
    f. Work hour modifications
    g. Coordination with local communities
    h. New or specialized training for employees
    i. More use of consultants
    j. Context Sensitive Design or Context Sensitive Solutions
    k. Pay differentials for employees working on these projects
    l. Other—Please specify:
    m. Other—Please specify:
    n. Comments:

Section 3—Project Delivery Strategies

15. Which is the most commonly used project delivery method (by number of projects) on your urban corridors? (Select one.)
    a. Design-bid-build
    b. Design-bid-build with A + B
    c. Design-build
    d. Construction Manager/General Contractor (CM/GC)
    e. Construction Manager at Risk (CM at R)
    f. Other—Please specify:
    g. Other—Please specify:
    h. Comments:

16. What are the reasons for choosing the method identified in Question 15? (Check all that apply.)
    a. Shorter construction schedule
    b. Price certainty (knowing what the final cost will be)
    c. Opportunities for innovation on the part of designers
    d. Opportunities for innovation on the part of contractors
    e. Ease of contract administration on the part of your agency
    f. Improved management of traffic during construction
    g. Improved management of stakeholder issues during construction
    h. Pressure or input from industry groups or associations
    i. Required by rule or law
    j. Pressure or input from elected officials
    k. Other—Please specify:
    l. Other—Please specify:
    m. Comments:

17. Do you use financial incentives for accelerating construction in your congested urban corridors?
    a. Yes
    b. No

If the answer to Question 17 is "Yes" then please answer the following. If Question 17 is "No" then proceed to Question 18.

18. What are the reason(s) for using incentives on your urban corridor projects? (Check all that apply.)
    a. Shorten the construction schedule
    b. Improve the overall quality of the project
    c. Finish the project and open it by a certain date
    d. Promises to the public or elected officials
    e. Reduce the impact of construction on the traveling public
    f. Other—Please specify:
    g. Other—Please specify
    h. Comments:

19. Do you use financial disincentives for construction in your urban corridors?
    a. Yes
    b. No

If the answer to Question 19 is "Yes" then please answer the following. If Question 19 is "No" then proceed to Question 20.

20. What are the reason(s) for using disincentives on your urban corridor projects? (Check all that apply.)
    a. Shorten the construction schedule
    b. Improve the overall quality of the project
    c. Finish the project and open it by a certain date
    d. Promises to the public or elected officials
    e. Reduce the impact of construction on the traveling public
    f. Other—Please specify:
    g. Other—Please specify:
    h. Comments:

21. Does your agency use both financial incentives and disincentives on the same urban corridor projects? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

22. Describe a project delivery technique that your agency uses to more effectively construct projects in urban corridors which would be of value to other agencies.

Section 4—Utilities

23. How often do utilities have a significant impact on the reconstruction efforts of urban corridors? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

24. What is the nature of the impacts utilities have on the construction efforts in urban corridors? (Check all that apply.)
    a. Financial
    b. Schedule
    c. Quality of the work
    d. Stakeholder relations
    e. Contract administration activities on the part of the agency
    f. Number of bidders on a project
    g. Other—Please specify:
    h. Other—Please specify:
    i. Comments:

25. What strategies has your agency used to mitigate the impacts of utilities on the urban corridor construction projects administered by your agency? (Check all that apply.)
    a. Early coordination with impacted utility companies
    b. Payment of some relocation expenses even if not required by law
    c. Payment of all relocation expenses even if not required by law
    d. Litigation
    e. Modifying state law to require more effective coordination between your agency and the utility companies
    f. On-going project specific coordination meetings with utility companies even before construction is started
    g. Other—Please specify:
    h. Other—Please specify:
    i. Comments:

26. Which of the following has your agency found to be most effective in dealing with the impacts of utilities in congested urban corridors? (Check 2.)
    a. Early coordination with impacted utility companies
    b. Payment of some relocation expenses even if not required by law
    c. Payment of all relocation expenses even if not required by law
    d. Litigation
    e. Modifying state law to require more effective coordination between your agency and the utility companies
    f. On-going coordination meetings with utility companies even before a specific project is started
    g. Other—Please specify:
    h. Other—Please specify:
    i. Comments:

27. Describe a technique your agency has used to mitigate the impact that utilities have had on your urban corridor projects which you would like to share with other agencies?

Section 5—Right-of-Way

28. In what way does right-of-way acquisition and related activities impact urban corridor construction in your agency? (Check all that apply.)
    a. Construction schedule (delays)
    b. Project schedule (delays before construction or letting)
    c. Project costs (increases)
    d. Increased project administration effort on the part of your agency
    e. Decreased interest from potential bidders
    f. Issues or problems with local communities
    g. Issues or problems relating to property owners who are not acquired
    h. Other—Please specify:
    i. Other—Please specify:
    j. Comments:

29. What is most difficult about the right-of-way acquisition process in your state as it relates to constructing projects in urban corridors? (Check 3.)
    a. Statutory restrictions on the process
    b. Too little time to complete acquisitions
    c. Inadequate funding
    d. Property owner expectations for compensation
    e. Legal processes
    f. Relocation of residential property owners
    g. Relocation of commercial property owners
    h. Staffing shortages
    i. Real estate market conditions
    j. Inability to hire outside staff to augment agency resources
    k. Other—Please specify:
    l. Other—Please specify:
    m. Comments:

30. What is the average time to acquire a residential property that doesn't require condemnation?
    a. Less than one month
    b. Two to three months
    c. Four to six months
    d. Six months to a year
    e. More than a year
    f. Comments:

31. What is the average time to acquire a residential property when condemnation is required?
    a. Less than one month
    b. Two to three months
    c. Four to six months
    d. Six months to a year
    e. More than a year
    f. Comments:

32. What percentage of residential properties required condemnation on your urban corridor projects?
    a. None
    b. Less than 5%
    c. 5–10%
    d. 10–25%
    e. 25–50%
    f. More than 50%
    g. Comments:

33. What is the average time to acquire a commercial property that doesn't require condemnation?
    a. Less than one month
    b. Two to three months
    c. Four to six months
    d. Six months to a year
    e. More than a year
    f. Comments:

34. What is the average time to acquire a commercial property where condemnation is required?
    a. Less than one month
    b. Two to three months
    c. Four to six months
    d. Six months to a year
    e. More than a year
    f. Comments:

35. What percentage of commercial properties requires condemnation on your urban corridor projects?
    a. None
    b. Less than 5%
    c. 5–10%
    d. 10–25%
    e. 25–50%
    f. More than 50%
    g. Comments:

36. Which of the following strategies does your agency employ to deal with right-of-way issues relating to construction projects in urban corridors? (Check all that apply.)
    a. Add additional staff to accelerate the acquisition process
    b. Pay incentives to property owners that agree to sell early in the process
    c. Use private sector resources to fill critical roles and augment agency staff (e.g., appraisers, relocation specialists, etc.)
    d. Pay incentives to private sector companies performing acquisition services for your agency
    e. Advertise projects before all parcels have been acquired or right of entry secured
    f. Award projects before all parcels have been acquired or rights of entry secured
    g. Use of the construction contractor to acquire rights of entry after awarding the construction contract
    h. Use of the construction contractor to acquire property after awarding the construction contract
    i. Other—Please specify:
    j. Other—Please specify:
    k. Comments:

37. Of the options listed in Question 36, which do you find to be the most effective in dealing with the impacts of right-of-way acquisition on the urban corridor projects constructed by your agency? (Check 3.)
    a. Add additional staff to accelerate the acquisition process
    b. Pay incentives to property owners that agree to sell early in the process
    c. Use private sector resources to fill critical roles and augment agency staff (e.g., appraisers, relocation specialists, etc.)
    d. Pay incentives to private sector companies performing acquisition services for your agency
    e. Advertise projects before all parcels have been acquired or right of entry secured
    f. Award projects before all parcels have been acquired or rights of entry secured
    g. Use of the construction contractor to acquire rights of entry after awarding the construction contract
    h. Use of the construction contractor to acquire property after awarding the construction contract
    i. Other—Please specify:
    j. Other—Please specify:
    k. Comments:

38. Of the options listed in Question 37, which do you find to be the least effective in dealing with the impacts of right-of-way acquisition on the urban corridor projects constructed by your agency? (Check 3.)
    a. Add additional staff to accelerate the acquisition process
    b. Pay incentives to property owners that agree to sell early in the process
    c. Use private sector resources to fill critical roles and to augment agency staff (e.g., appraisers, relocation specialists, etc.)
    d. Pay incentives to private sector companies performing acquisition services for your agency
    e. Advertise projects before all parcels have been acquired or right of entry secured
    f. Award projects before all parcels have been acquired or rights of entry secured
    g. Use of the construction contractor to acquire rights of entry after awarding the construction contract
    h. Use of the construction contractor to acquire property after awarding the construction contract
    i. Other—Please specify:
    j. Other—Please specify:
    k. Comments:

39. Describe right-of-way acquisition techniques that your agency uses that make the process more effective which you believe would bring value to other agencies.

Section 6—Stakeholder/Public Involvement

For the purposes of this survey, stakeholder/public involvement is defined as those activities directed at specific groups of individuals or entities impacted by a project. For example, homeowners adjacent to the project and emergency medical services are included in this group. Activities associated with working with the media, press releases or other public relations work is not part of this section of the questionnaire.

40. Does your agency assign a project specific individual to its urban corridor projects for the purpose of managing stakeholder issues or public/community involvement activities? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

41. Is this person an agency employee? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

42. Is this person a private contractor? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

43. Are individual projects "branded" (giving the project a unique identity, logo, name or reference) for communications or other purposes? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

44. What activities does your agency use to involve and inform stakeholder groups on your urban corridor projects? (Check all that apply.)
    a. Town hall meetings
    b. Public notices in the newspaper
    c. Project specific website
    d. Project specific web information found on your agency's general website
    e. Phone calls
    f. Flyers distributed to residences or building occupants
    g. Door to door visits by project personnel
    h. Other newspaper advertising or stories
    i. Mail distribution
    j. Radio coverage
    k. Television coverage
    l. Social media (Facebook, Twitter, etc.)
    m. Blog
    n. Other—Please specify:
    o. Other—Please specify:
    p. Comments:

45. Which activities does your agency find to be most effective for involving and informing stakeholder groups on your urban corridor projects? (Check 3.)
    a. Town hall meetings
    b. Public notices in the newspaper
    c. Project specific website
    d. Project specific web information found on your agency's general website
    e. Phone calls
    f. Flyers distributed to residences or building occupants
    g. Door to door visits by project personnel
    h. Other newspaper advertising or stories
    i. Radio coverage
    j. Television coverage
    k. Social media (Facebook, Twitter, etc.)
    l. Blog
    m. Other—Please specify:
    n. Other—Please specify:
    o. Comments:

46. Has your agency targeted specific stakeholder groups such as businesses with mitigation efforts?
    a. Yes
    b. No
    c. Comment:

47. Please check those groups which your agency has targeted mitigation strategies/plans for dealing with their concerns:
    a. Businesses
    b. Residents
    c. Travelers
    d. Business deliveries
    e. Truckers
    f. Commuters
    g. Elected officials
    h. Recreationalists
    i. Sports fans
    j. Other—Please specify:
    k. Other—Please specify:
    l. Comments:

48. Of these groups which are most important to deal with? (Select 3.)
    a. Businesses
    b. Residents
    c. Travelers
    d. Business deliveries
    e. Truckers
    f. Commuters
    g. Elected officials
    h. Recreationalists
    i. Sports fans
    j. Other—Please specify:
    k. Other—Please specify:
    l. Comments:

49. What techniques is your agency using to effectively deal with stakeholder groups that you believe would be of value to other agencies?

Section 7—Media Relations

For the purpose of this survey media relations are those activities focused on communicating with the media (e.g., television, radio, newspaper, etc.).

50. Does your agency assign a project specific individual to its urban corridor projects for the purpose of managing media relations? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

51. Is this person an agency employee? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

52. Is this person a private contractor? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comments:

53. Which of the following best describes your agency's view and relationship with the media? (Check one.)
    a. The media is suspect and we don't interact with them any more than we have to
    b. The media isn't looking for good news so they never write or say positive things about our agency or its projects
    c. The media has been neutral about our projects and largely ignore us
    d. The media has responded in a generally positive way to our efforts to work with them
    e. The media has been a strong partner in getting critical information to the public during construction
    f. Other—Please specify:
    g. Other—Please specify:
    h. Comments:

54. Which of the following strategies does your agency use to communicate information to stakeholder groups? (Check all that apply.)
    a. Free "tags" on radio announcements such as traffic reports
    b. Paid "tags" on radio announcements such as traffic reports
    c. We rely on the radio to cover our projects when they have time and interest
    d. We rely on television stations to cover our projects when they have time and interest
    e. We purchase commercial time with radio stations
    f. We purchase commercial time with television stations
    g. Editorial board meetings
    h. We rely on the relationships we have with key media people to access their audiences and get our word out
    i. Other—Please specify:
    j. Other—Please specify:
    k. Comment:

55. Which of the strategies listed in Question 54 are most effective for your agency in getting information to your stakeholders? (Check no more than three.)
    a. Free tags on radio announcements such as traffic reports
    b. Paid tags on radio announcements such as traffic reports
    c. We rely on the radio to cover our projects when they have time and interest
    d. We rely on television stations to cover our projects when they have time and interest
    e. We purchase commercial time on radio stations
    f. We purchase commercial time on television stations
    g. We rely on the relationships we have with key media people to access their audiences and get our word out
    h. Other—Please specify:
    i. Other—Please specify:
    j. Comment:

56. How did you know which ones to check in Question 55? (Check all that apply.)
    a. Surveys of stakeholders
    b. Experience
    c. Informal statistics we keep based on calls to the agency
    d. Feedback from the media
    e. Public feedback at meetings
    f. Neighborhood groups
    g. Focus groups
    h. Other—Please specify:
    i. Other—Please specify:
    j. Comment:

57. What techniques is your agency using to effectively deal with media relations that you believe would be of value to other agencies?

Section 8—Intermodal Issues

58. How often are other modes (e.g., transit, bicycle, pedestrian) present in your congested urban corridor projects? (Check one.)
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comment:

59. If other modes are present in your urban corridor projects what measures do you take to address their operations before construction? (Check all that apply.)
    a. Coordination with other modes during the planning process
    b. Coordination with the other modes during the engineering design process
    c. Permanent on-going meetings/committees with transit agencies
    d. Permanent on-going meetings/committees with bicycle and pedestrian groups
    e. Project specific meetings/committees with transit agencies
    f. Project specific meetings/committees with bicycle and pedestrian groups
    g. No meaningful coordination
    h. No coordination is necessary
    i. Our agency uses in-house staff who know about the other modes so no external coordination is necessary
    j. Other—Please specify:
    k. Other—Please specify:
    l. Comment:

60. Do you rely on the other modes to assist with throughput in the urban corridor during construction?
    a. Never
    b. Sometimes
    c. Often
    d. Very often
    e. Always
    f. Comment:

61. How effective are the other modes in diverting traffic from automobiles and relieving congestion pressure during construction of your urban corridors? (Check one.)
    a. Not effective at all
    b. Some effectiveness
    c. Moderate effectiveness
    d. Very effective
    e. Not applicable
    f. Comment:

62. What techniques is your agency using to effectively deal with other transportation modes that you believe would be of value to other agencies?

Section 9—Traffic Management Issues

63. What strategies does your agency use to manage traffic during construction of projects in urban corridors? (Check all that apply.)
    a. Partial closures during the day
    b. Partial closures during the night
    c. Full closures during the day
    d. Full closures at night
    e. Aggressive detour routing
    f. Some detour routing
    g. Lane rental specifications
    h. Penalties for late opening of closures
    i. Milestones and/or construction phasing
    j. Contractor developed traffic control plan
    k. Agency developed traffic control plans
    l. Contractor provided traffic control
    m. Agency provided traffic control
    n. Use of in-place ITS resources
    o. Use of temporary ITS resources provided by the agency
    p. Use of temporary ITS resources provided by the contractor
    q. Other—Please specify:
    r. Other—Please specify:
    s. Comment:

64. What techniques is your agency using to effectively deal with traffic management that you believe would be of value to other agencies? (Text block)

65. Given that traffic control and management are a substantial cost element for urban projects, how has your agency endeavored to reduce these costs? (Text block)

66. Do you have a project that would be useful to share with other agencies that we could explore in greater detail as a case study?
    a. Yes
    b. No
    c. Not sure

If you answered "yes" to Question 66, what project is it and who would be the contact person to get further information?

67. Does your agency have or use a traffic management center (TOC, TMC) to help deal with project and program travel demand management?
    a. Yes
    b. No
    c. Comment:

68. What has your agency done to comply with the Federal regional mobility requirements for coordination of program within urban areas?

Thank you for taking the time to participate in this survey. Your input is greatly appreciated and will contribute in a meaningful way to the conclusions and recommendations for this report.

SUBMIT

APPENDIX B

Narrative Survey Responses

Section 1—Background Information

Section 2—Capital Program Characteristics

9. What is the size of your agency's annual capital improvement program?

- ☐ a. Less than $100 million
- ☐ b. $101 million–$200 million
- ☐ c. $201 million–$500 million
- ☐ d. $501 million–$1 billion
- ☐ e. More than $1 billion

Comments:

5	Based on 08-11 STIP program; Includes only $13.2 million for Columbia River Crossing (CRC) project (Joint project by ODOT and WSDOT).	Oregon
5	INDOT within current historic level of capital program investment between FY 2010–2012.	Indiana
5	Includes Planning/Environment, ROW, Preliminary Engineering, Construction, and Maintenance.	Tennessee

10. Construction work in congested urban corridors can take many forms. Please identify the kind of work your agency does on your urban corridors. (Check all that apply.)

- ☐ a. Improvements on urban arterial streets with minimal access control
- ☐ b. Improvements on urban arterial streets with aggressive access control
- ☐ c. Improvements on controlled access highways
- ☐ d. All of the above
- ☐ e. None of the above

Comments:

11. If you had to identify a trend in the project size most often constructed on the urban corridors by your agency which of the following would be the most prevalent?

- ☐ a. Less than $100 million
- ☐ b. $101 million–$200 million
- ☐ c. $201 million–$500 million
- ☐ d. $501 million–$1 billion
- ☐ e. More than $1 billion

Comments:

4	State and federal funded projects generally under $100M, but developing several public private partnerships over $500M.	Texas
1	Many of the smaller projects are around $1 million.	Louisiana
1	Typical is less than $100M. However we have several in excess of the threshold.	Utah
1	WSDOT is engaging in several multi-million dollar mega projects.	Washington
1	State and federal funded projects generally under $100M but developing several public private partnerships over $500M	New York

12. Has your agency taken any special measures to address the issues associated with constructing projects in congested urban corridors?

- ☐ a. Yes
- ☐ b. No

Comments:

1	The Seattle area has an aggressive Traffic Control Management plan which controls all projects	Washington
1	Multiple projects at once, expedited schedule, night work, freeway closures for entire project or for a few days at a time.	Michigan
1	Using Traffic Management Plans, the maintenance and protection of traffic as shown on the plans are placed directly in the contract as a pay item, so that the contractor knows upfront the responsibilities. Roadwork Restriction Permitting: notification to the traffic unit of proposed lane closures, so they can be coordinated with other projects and events in the area. Project Design is changed so that closures are not as long. Contra flow lanes have two lanes during peak hours, shut one down during work, splitting directional lanes over structures or have lane rentals to shorten closures. Work with local municipalities and developers on Highway Occupancy Permits.	Pennsylvania
1	Addressed in ADOT's Work Zone Safety and Mobility Policy.	Arizona
1	Independent project reviews with numerous stakeholders and experts.	New York

If the answer to Question 12 is "Yes" then please answer the following. If Question 12 is "No," then proceed to Question 15.

13. Are these special measures taken as individual project measures or are they programmatic? (e.g., are you using acceleration programmatically or on a project by project basis?)

- ☐ a. Individual projects
- ☐ b. Programmatic
- ☐ c. Both

Describe any programmatic measures taken.

3	OTIA 3 Bridge Program has been delivered based on the programmatic basis by bundling or on an individual project basis.	Oregon
3	Alternate Contracting, P+T (A+B) bidding on all projects, Accelerated Construction Methodologies, and Community Council Public Incentives.	Utah
3	Context Sensitive Design Guide, policy encouraging alternatives in design and construction.	Mass
2	Some outlying areas are controlled at the project level.	Washington
3	R/W cost incentives.	Indiana
3	All major projects in Ohio are approved as part of a system/programmatic basis but with special considerations.	Ohio
3	Consideration of combining and coordination of planned projects.	Tennessee
3	The programmatic measures of Smart Transportation, Context Sensitive Design, Context Sensitive Solutions, and FHWA environmental agreements are used during design. Every project starts with a general Traffic Management Plan that is then adjusted using a tool box of items such as road users liquidated damages, lane rentals, and night or off-peak work hours.	Pennsylvania
3	Night time closures, liquidated damages for failure to open roadways in a timely manner, communication and public involvement.	Arizona
3	Required traffic management plans, coordination of closures by using a transportation management center.	California
3	Context sensitive design, sustainability policy	San Francisco

14. What types of actions has your agency taken to address the issues associated with construction of projects in congested urban corridors? (Check all that apply.)

- ☐ a. No actions
- ☐ b. Organizational or structural changes in your agency
- ☐ c. Changes in staffing (e.g., additional staff, staff reductions, hiring individuals with different skill sets, etc.)

- ☐ d. New or different equipment
- ☐ e. Different contracting methods (e.g., design-build, job order contracting, CMGC, A+B, etc.)
- ☐ f. Work hour modifications
- ☐ g. Coordination with local communities
- ☐ h. New or specialized training for employees
- ☐ i. More use of consultants
- ☐ j. Context Sensitive Design or Context Sensitive Solutions
- ☐ k. Pay differentials for employees working on these projects
- ☐ l. Other—please specify:

Lane rental, milestones, incentives and disincentives for completion.	Texas
Full partnering on projects with local agencies.	Washington
Special coordination and use of two step Design Build recently used.	Ohio
Night-time construction	New York
Implemented design exceptions to achieve designs more appropriate for urban settings.	San Francisco

- ☐ m. Other—please specify:

Comments:

These actions are not specific to congested urban corridors	Louisiana
Most work in congested urban areas is done as night or off-peak business hours. Metropolitan Planning Organizations attend meetings with community stakeholders. Less complex projects have used design-build. Some projects have used the traffic sensors in the area Intelligent traffic systems to inform the community of construction delays.	Pennsylvania
Standard is Design-Bid-Build. Alternative contracting methods is relatively new to us.	Nevada

Section 3—Project Delivery Strategies

15. Which is the most commonly used project delivery method (by number of projects) on your urban corridors? (Check one.)

- ☐ a. Design-bid-build
- ☐ b. Design-bid-build with A + B
- ☐ c. Design-build
- ☐ d. Construction Manager/General Contractor (CM/GC)
- ☐ e. Construction Manager at Risk (CM at R)
- ☐ f. Other—please specify:

Prime contractor	Michigan

Comments:

Most common by #. However, by contract amount, D/B, and CM/GC significantly outweigh the numbers.	Utah
We are also starting to use Design-Build and are looking at A+B.	Massachusetts
Have done some A+B as well.	Tennessee DOT
The Department has done some Design-build, A+B, and Construction Managers, but are not the most common.	Pennsylvania
Design-Bid-Build has been our standard. We have done A+B in past but rarely. We are working on our 2nd Design-Build and have plans for a third. We are also very interested in CMGC but need legislation.	Nevada
New York does not have enabling legislation for design-build for the agency.	New York

16. What are the reasons for choosing the method identified in Question 15? (Check all that apply.)

- ☐ a. Shorter construction schedule
- ☐ b. Price certainty (knowing what the final cost will be)
- ☐ c. Opportunities for innovation on the part of designers
- ☐ d. Opportunities for innovation on the part of contractors
- ☐ e. Ease of contract administration on the part of your agency
- ☐ f. Improved management of traffic during construction
- ☐ g. Improved management of stakeholder issues during construction
- ☐ h. Pressure or input from industry groups or associations
- ☐ i. Required by rule or law
- ☐ j. Pressure or input from elected officials
- ☐ k. Pay differentials for employees working on these projects
- ☐ l. Other—please specify:

Design-bid-build is our standard practice; we use design-build on a limited basis.	Louisiana
Traditional method for bulk of contracts. Alternatives being tested and considered.	Massachusetts
Design-Bid-Build is the traditional project delivery method used at CDOT.	Colorado
The reality is that the majority of work in our urban areas is approached through traditional methods.	Washington
It is our standard contracting method, thus it is used on most projects.	Oregon
Standard procedure.	Michigan
Our standard method used for many years.	Nevada
Low bid.	Arizona

- ☐ m. Other—please specify:

Comments:

We utilize DB and CMGC on all “major” urban projects as well as many small Low-Bid D/B projects in the urban area for the reasons identified.	Utah
State law limited the amount of projects GDOT could build using design-build. The law was changed this year so some restrictions will be lifted this summer.	Georgia
Main reason for use of DBB is that it is required by law. FDOT is permitted by law to use other innovative contracting types and does so often. There is a limitation within the statutes on how much of the work program can be delivered with innovative or alternative contracting methods.	Florida

17. Do you use financial incentives for accelerating construction in your congested urban corridors?

- ☐ a. Yes
- ☐ b. No

If the answer to Question 17 is "Yes" then please answer the following. If Question 17 is "No," then proceed to Question 19.

18. What are the reason(s) for using incentives on your urban corridor projects? (Check all that apply.)

- ☐ a. Shorten the construction schedule
- ☐ b. Improve the overall quality of the project
- ☐ c. Finish the project and open it by a certain date
- ☐ d. Promises to the public or elected officials
- ☐ e. Reduce the impact of construction on the traveling public
- ☐ f. Other—please specify:

- ☐ g. other—Please specify:

Comments:

Material Incentives are used on all projects regardless of location. Time incentives are also used to accomplish the outcomes identified.	Utah
We use financial incentives occasionally. NOT on all projects.	Michigan
Only used on a case by case basis. Most projects do not have incentives.	Nevada
Prior to budgeting issues, FDOT used Incentives/Disincentives on many of its urban, higher profile projects. Have had to scale this back presently due to funding.	Florida

19. Do you use financial disincentives for construction in your urban corridors?

- ☐ **a. Yes**
- ☐ **b. No**

If the answer to Question 19 is "Yes" then please answer the following. If Question 19 is "No," then proceed to Question 21.

20. What are the reason(s) for using disincentives on your urban corridor projects? (Check all that apply.)

- ☐ **a. Shorten the construction schedule**
- ☐ **b. Improve the overall quality of the project**
- ☐ **c. Finish the project and open it by a certain date**
- ☐ **d. Promises to the public or elected officials**
- ☐ **e. Reduce the impact of construction on the traveling public**
- ☐ **f. Other—please specify:**

Reduce the number of bidders with limited resources.	Colorado
Reduce bad press of an ongoing project.	Pennsylvania

- ☐ **g. Other—please specify:**

Maintain contract work schedule to avoid special community events	Pennsylvania

Comments:

Liquidated damages are considered as disincentives.	Oregon
See comments for question 18.	Utah
Disincentives are in the construction contract as road users liquidated damages.	Pennsylvania
FDOT matches its incentives with equal disincentives.	Florida

21. Does your agency use both financial incentives and disincentives on the same urban corridor projects?

- ☐ **a. Never**
- ☐ **b. Sometimes**
- ☐ **c. Often**
- ☐ **d. Very often**
- ☐ **e. Always**

Comments:

Sometimes	I-5/Kruseway was the only project in Portland metro area, where this was utilized.	Oregon
Always	Incentive and disincentives apply on all projects.	Utah
Always	FDOT matches its incentives with equal disincentives.	Florida

Very Often	Incentive—material quality; disincentive—reduce construction impact.	Arizona
Very Often	I/D clauses, A+B, lane rental.	New York

22. Describe a project delivery technique that your agency uses to more effectively construct projects in urban corridors which would be of value to other agencies.

Comment:

Lane Rental.	Colorado
Design build is used to accelerate the pre-construction process.	Louisiana
Discussed at various subsections of the survey.	Oregon
Design Build, CMGC and Low-Bid Design Build.	Utah
N/A.	Massachusetts
Increased usage of alternative contracting such as Design-Build.	Colorado
Traffic Management Strategies—engaging how to construct early on in a project.	Washington
We have used weekend closures to allow contractors to work without dealing with traffic.	Oregon
Lane or ramp rental. Contractor is “charged” for the length of time the lane or ramp is closed.	Michigan
Two-step design-build.	Ohio
Interstate road closure.	Missouri
Included utility relocations as part of the contract.	Tennessee
Usual mode of project delivery is Design-Bid-Build; however, the Department is beginning to rely on Design-Build projects for minor projects. The contractor submits plans to the district for review. All of the required engineers review the plans at the same time. The first review has 10 days then subsequent reviews have 5 days. For an extra fee, the contractor can have a faster review. The contractor can also request that a consultant review the plans.	Pennsylvania
A+B with I/D has been used often with success. Also, DB with me /D or bonus.	Florida
We always utilize design-bid-build.	Chicago
Combination Design-Build, A+B and workmanship incentives.	Arizona
Design, bid, build with A + B. This allows a contractor to shorten the duration by using efficiencies. This method is used when there are lower risks due to utilities, etc.	California
We always utilize design-bid-build	Chicago
Project specific work-zone constructability reviews (bidability, buildability, M&PT) with construction industry, engineering industry, state police, FHWA, in-house experts and outside experts.	New York
Public private partnerships (P3)	San Francisco

Section 4—Utilities

23. How often do utilities have a significant impact on the reconstruction efforts of urban corridors? (Check one.)

- ☐ **a. Never**
- ☐ **b. Sometimes**
- ☐ **c. Often**
- ☐ **d. Very often**
- ☐ **e. Always**

Comments:

Sometimes	Depends on the scope of the project.	Ohio
Sometimes	FDOT works closely with utility agencies to try to have facilities out of the way for construction.	Florida

If the answer to Question 23 is "Never," then proceed to Question 27.

24. What is the nature of the impacts utilities have on the construction efforts in urban corridors? (Check all that apply.)

- ☐ a. Financial
- ☐ b. Schedule
- ☐ c. Quality of the work
- ☐ d. Stakeholder relations
- ☐ e. Contract administration activities on the part of the agency
- ☐ f. Number of bidders on a projects
- ☐ g. Other—please specify:

Coordination with other infrastructure projects can be impacted.	Colorado

- ☐ h. Other—please specify:

none

Comments:

none

25. What strategies has your agency used to mitigate the impacts of utilities on the urban corridor construction projects administered by your agency? (Check all that apply.)

- ☐ a. Early coordination with impacted utility companies
- ☐ b. Payment of some relocation expenses even if not required by law
- ☐ c. Payment of all relocation expenses even if not required by law
- ☐ d. Litigation
- ☐ e. Modifying state law to require more effective coordination between your agency and the utility companies
- ☐ f. Ongoing project specific coordination meetings with utility companies even before construction is started
- ☐ g. Other—please specify:

Contracted project specific utility location staff to represent a local public utility owner during construction.	Oregon

- ☐ h. Other—please specifies:

With prior approval utility has been incorporated into the construction contract, when the work was completed, the utility has reimbursed the state for the cost.	Pennsylvania
Subsurface Engineering (potholes) to identify conflicts.	Nevada
Separate and advance utility relocation contracts	San Francisco

Comments:

Payment for utility relocation is precluded by constitution in Washington State.	Washington
Communication with the utilities is proactive. The utilities are notified annually of upcoming construction projects in their area. Utilities are invited to state quarterly meetings and regionally bimonthly meetings to discuss upcoming highway projects. To coordinate work schedules for specific projects the utilities are invited to scoping and design field views and then during construction they are invited to the bi-weekly construction meetings.	Pennsylvania

26. Which of the following has your agency found to be most effective in dealing with the impacts of utilities in congested urban corridors? (Check 2.)

- ☐ a. Early coordination with impacted utility companies
- ☐ b. Payment of some relocation expenses even if not required by law
- ☐ c. Payment of all relocation expenses even if not required by law
- ☐ d. Litigation

- [ ] e. Modifying state law to require more effective coordination between your agency and the utility companies
- [ ] f. Ongoing coordination meetings with utility companies even before a specific project is started
- [ ] g. Other—Please supply:

We have not found an effective method.	Colorado
Including utility costs in contractor bid price for Lump Sum D/B projects to incentivize minimization of utility relocations.	Utah
On DB—WSDOT has transferred our legal rights to the contractors.	Washington
None of the above.	Illinois
Include relocation as part of the contract so the prime contractor is responsible.	Tennessee
Separate construction contract for early relocation of utilities.	Arizona
Separate and advance utility relocation contracts	San Francisco

- [ ] h. Other—Please supply:

Comments:

27. Describe a technique your agency has used to mitigate the impact that utilities have had on your urban corridor projects which you would like to share with other agencies?

Comment:

Adding utility work to the contract.	Oregon
Including utility relocation costs and relocation work in contractor scope on DB projects. Any unused "budget" is shared by contractor and Department. Any overrun is likewise shared.	Utah
Each District has an employee assigned to do early utility coordination during design.	Massachusetts
# 25 E.	Colorado
N DB—WSDOT has transferred our legal rights to the contractors.	Washington
Have INDOT contractor construct utility relocation as part of contract, have INDOT contractor oversee and verify locations of utility relocations, purchase utility easements as part of right-of-way purchasing.	Indiana
Subsurface utility engineering and including the utility work into the highway contract thereby eliminating the "third party" work on construction.	Georgia
Early coordination is the key.	Ohio
To reduce impact on both agencies, the Department has employed utility location services during design to perform subsurface investigations to identify where underground facilities are located, so that they can be avoided if possible. Part of the coordination efforts between the Department and utilities is to match up resources for projects. Utility companies are downsizing, so scheduling work for projects with the Department has become more critical. The Department has used the technique Substitute Right-of-Way, where the Department will acquire the right-of-way for the utility during the design process and for some projects the Department will contract the work with the utility reimbursing the costs. The Department has participated on websites that share utility information.	Pennsylvania
(See question 26 g.)	Arizona
Communication, communication, communication and collaboration, and coordination!	California
Separate and advance utility relocation contracts	San Francisco

Section 5—Right of Way

28. In what way does right of way acquisition and related activities impact urban corridor construction in your agency? (Check all that apply.)

- [ ] a. Construction schedule (delays)
- [ ] b. Project schedule (delays before construction or letting)
- [ ] c. Project costs (increases)

- [ ] d. Increased project administration effort on the part of your agency
- [ ] e. Decreased interest from potential bidders
- [ ] f. Issues or problems with local communities
- [ ] g. Issues or problems relating to property owners who are not acquired
- [ ] h. Other—please specify:

Dealing with commercial properties that have leases or franchises in another state.	Pennsylvania

- [ ] I. Other—please specify:

Comments:

WSDOT avoids acquisition of ROW during construction. May be used on upcoming DB project(s).	Washington
The biggest issues are the lack of lead time given to projects which require R/W and the lack of R/W plan detail.	Pennsylvania

29. What is most difficult about the right of way acquisition process in your state as it relates to constructing projects in urban corridors? (Check up to 3.)

- [ ] a. Statutory restrictions on the process
- [ ] b. Too little time to complete acquisitions
- [ ] c. Inadequate funding
- [ ] d. Property owner expectations for compensation
- [ ] e. Legal processes
- [ ] f. Relocation of residential property owners
- [ ] g. Relocation of commercial property owners
- [ ] h. Staffing shortages
- [ ] i. Real estate market conditions
- [ ] j. Inability to hire outside staff to augment agency resources
- [ ] k. Other—please specify:

Dealing with tribal lands.	Arizona

- [ ] l. Other—please specify:

Comments:

30. What is the average time to acquire a residential property that doesn't require condemnation?

- [ ] a. Less than one month
- [ ] b. Two to three months
- [ ] c. Four to six months
- [ ] d. Six months to a year
- [ ] e. More than a year

Comments:

This is acquisition time after the appraisal has been completed and reviewed.	Michigan
For questions 30–35 the responses are for a whole property take. If the property has material and equipment to be sold off of it, the time will be more than a year.	Pennsylvania

31. What is the average time to acquire a residential property when condemnation is required?

- ☐ a. Less than one month
- ☐ b. Two to three months
- ☐ c. Four to six months
- ☐ d. Six months to a year
- ☐ e. More than a year

Comments:

18–24 Months. Condemnation of residential is rare.	Nevada
No Experience	San Francisco

32. What percentage of residential properties required condemnation on your urban corridor projects?

- ☐ a. None
- ☐ b. Less than 5%
- ☐ c. 5–10%
- ☐ d. 10–25%
- ☐ e. 25–50%
- ☐ f. More than 50%

Comments:

We do not keep "urban corridor" records.	Colorado

33. What is the average time to acquire a commercial property that doesn't require condemnation?

- ☐ a. Less than one month
- ☐ b. Two to three months
- ☐ c. Four to six months
- ☐ d. Six months to a year
- ☐ e. More than a year

Comments:

This is the acquisition time after the appraisal has been completed and reviewed.	Michigan

34. What is the average time to acquire a commercial property where condemnation is required?

- ☐ a. Less than one month
- ☐ b. Two to three months
- ☐ c. Four to six months
- ☐ d. Six months to a year
- ☐ e. More than a year

Comments:

We do not keep "urban corridor" records.	Colorado
18–24 months.	Nevada
No experience	San Francisco

35. What percentage of commercial properties requires condemnation on your urban corridor projects?

- ☐ a. None
- ☐ b. Less than 5%

- [ ] c. 5–10%
- [ ] d. 10–25%
- [ ] e. 25–50%
- [ ] f. More than 50%

Comments:

We do not keep “urban corridor” records.	Colorado
New state (PISTOL) laws may affect this.	Nevada

36. Which of the following strategies does your agency employ to deal with right of way issues relating to construction projects in urban corridors? (Check all that apply.)

- [ ] a. Add additional staff to accelerate the acquisition process
- [ ] b. Pay incentives to property owners that agree to sell early in the process
- [ ] c. Use private sector resources to fill critical roles and augment agency staff (e.g., appraisers, relocation specialists, etc.)
- [ ] d. Pay incentives to private sector companies performing acquisition services for your agency
- [ ] e. Advertise projects before all parcels have been acquired or right of entry secured
- [ ] f. Award projects before all parcels have been acquired or rights of entry secured
- [ ] g. Use of the construction contractor to acquire rights of entry after awarding the construction contract
- [ ] h. Use of the construction contractor to acquire property after awarding the construction contract
- [ ] i. Other—please specify:

Right of Occupancy.	Utah
Early involvement of R/W staff at planning and base plans.	Michigan
Advertise and award with tract availability dates in the contract.	Tennessee
Additional time added into design schedule based on how many properties.	Pennsylvania

- [ ] j. Other—please specify:

Advanced acquisition funding (before F.E.I.S. and R.O.D.) for critical parcels.	Michigan
Have local realtors help property owners with relocation.	Pennsylvania

Comments:

Holdout with due dates are written into bidding documents. Bid lets will be delayed If for some reason hold out dates are not met	Oregon
However ADOT is in the process of reducing # of consultants and increasing agency staff.	Arizona
No special strategies	San Francisco

37. Of the options listed in Question 36, which do you find to be the most effective in dealing with the impacts of right of way acquisition on the urban corridor projects constructed by your agency? (Check up to 3.)

- [ ] a. Add additional staff to accelerate the acquisition process
- [ ] b. Pay incentives to property owners that agree to sell early in the process
- [ ] c. Use private sector resources to fill critical roles and augment agency staff (e.g., appraisers, relocation specialists, etc.)
- [ ] d. Pay incentives to private sector companies performing acquisition services for your agency
- [ ] e. Advertise projects before all parcels have been acquired or right of entry secured
- [ ] f. Award projects before all parcels have been acquired or rights of entry secured
- [ ] g. Use of the construction contractor to acquire rights of entry after awarding the construction contract
- [ ] h. Use of the construction contractor to acquire property after awarding the construction contract
- [ ] i. Other—please specify:

Early involvement of R/W staff to change some partial acquisitions to total acquisitions and vice versa.	Michigan
Advertise and award with tract availability dates in the contract.	Tennessee

☐ **j. Other—please specify:**

Comments:

Haven't found anything great yet.	Washington

38. Of the options listed in Question 37, which do you find to be the least effective in dealing with the impacts of right of way acquisition on the urban corridor projects constructed by your agency? (Check up to 3.)

☐ **a. Add additional staff to accelerate the acquisition process**
☐ **b. Pay incentives to property owners that agree to sell early in the process**
☐ **c. Use private sector resources to fill critical roles and augment agency staff (e.g., appraisers, relocation specialists, etc.)**
☐ **d. Pay incentives to private sector companies performing acquisition services for your agency**
☐ **e. Advertise projects before all parcels have been acquired or right of entry secured**
☐ **f. Award projects before all parcels have been acquired or rights of entry secured**
☐ **g. Use of the construction contractor to acquire rights of entry after awarding the construction contract**
☐ **h. Use of the construction contractor to acquire property after awarding the construction contract**
☐ **i. Other—please specify:**

☐ **j. Other—please specify:**

Comments:

High risk business strategy.	Indiana
We would only consider using the 3 identified in question 37, A, B & C	Georgia
N/A —the only option listed above used by ADOT is (c), which is being reduced.	Arizona

39. Describe right of way acquisition techniques that your agency uses that make the process more effective which you believe would be of value to other agencies.

Agency's—yet to be implemented. Right-of-way tracking system should streamline the process by making tracking the process much easier and more efficient.	Oregon
Use of Right of Occupancy, Incentive Payments and Negotiated Settlements, Mediation and Arbitration.	Utah
# 36 A.	Colorado
Use consultants for large urban projects.	Illinois
Full turnkey of all development (PE and RW) within same consultant team.	Indiana
Early involvement of R/W staff in the planning and design process to suggest changes/revisions and to protect the R/W budget.	Michigan
1) GDOT utilizes an Agency Appeal process if negotiations are unsuccessful at District Level prior to condemnation. 2) Creation of a graduated scale of approval levels for condemnation at various levels of supervision/authority leading up the ROW Administrator having highest level of approval/authority. 3) Tracking of critical events throughout acquisition of ROW.	Georgia
Flexibility in R/W clearance certifications.	Missouri
The Department has set statewide policy and procedures for our Districts to use for right-of-way acquisition. Right-of-way acquisition takes time; make sure the project design schedule has enough of it. Use in house staff, but during busier months hire consultant acquisition firms that are competent and qualified with the correct licenses.	Pennsylvania
Resource driven activity—takes time and people; when work load increases dramatically it becomes difficult to maintain level of service.	New York

Section 6—Stakeholder/Public Involvement

40. Does your agency assign a project specific individual to its urban corridor projects for the purpose of managing stakeholder issues or public/community involvement activities? (Check one.)

☐ **a. Never**
☐ **b. Sometimes**

- [ ] **c. Often**
- [ ] **d. Very often**
- [ ] **e. Always**

Comments:

None

If the answer to Question 40 is "Never," then proceed to Question 43.

41. Is this person an agency employee? (Check one.)

- [ ] **a. Never**
- [ ] **b. Sometimes**
- [ ] **c. Often**
- [ ] **d. Very often**
- [ ] **e. Always**
- [ ] **f. N/A**

Comments:

None

42. Is this person a private contractor? (Check one.)

- [ ] **a. Never**
- [ ] **b. Sometimes**
- [ ] **c. Often**
- [ ] **d. Very often**
- [ ] **e. Always**
- [ ] **f. N/A**

Comments:

The private contractor will work with a Department person, who will then talk to the public.	Pennsylvania
Private consultants are used to perform task specific items, however, ADOT manages process.	Arizona

43. Are individual projects "branded" (giving the project a unique identity, logo, name or reference) for communications or other purposes?

- [ ] **a. Never**
- [ ] **b. Sometimes**
- [ ] **c. Often**
- [ ] **d. Very often**
- [ ] **e. Always**

Comments:

Department projects generally start out with an internal name, sometimes this carries throughout the life of the project with just the Department logo and any project contractor's logos. Larger projects are usually "branded" for the purpose of public identification and have had a logo developed or a community logo contest.	Pennsylvania
This is relatively new for us.	Nevada

44. What activities does your agency use to involve and inform stakeholder groups on your urban corridor projects? (Check all that apply.)

- ☐ a. Town hall meetings
- ☐ b. Public notices in the newspaper
- ☐ c. Project specific website
- ☐ d. Project specific web information found on your agency's general website
- ☐ e. Phone calls
- ☐ f. Flyers distributed to residences or building occupants
- ☐ g. Door to door visits by project personnel
- ☐ h. Other newspaper advertising or stories
- ☐ i. Mail distribution
- ☐ j. Radio coverage
- ☐ k. Television coverage
- ☐ l. Social media (Facebook, Twitter, etc.)
- ☐ m. Blog
- ☐ n. Other—please specify:

Public Hearings.	Illinois
Have news conferences for individual projects.	Pennsylvania
Transportation System Management (TSM) meetings.	Arizona

- ☐ o. Other—please specify:

Public Announcements.	Illinois
Mass text message notification.	Pennsylvania

Comments:

Metropolitan Planning Organizations have email distribution about projects.	Pennsylvania
TSM meetings include ADOT, local governments, contractors, media, DPS, and other interested /agencies or groups.	Arizona

45. Which activities does your agency find to be most effective for involving and informing stakeholder groups on your urban corridor projects? (Check 3.)

- ☐ a. Town hall meetings
- ☐ b. Public notices in the newspaper
- ☐ c. Project specific website
- ☐ d. Project specific web information found on your agency's general website
- ☐ e. Phone calls
- ☐ f. Flyers distributed to residences or building occupants
- ☐ g. Door to door visits by project personnel
- ☐ h. Other newspaper advertising or stories
- ☐ i. Mail distribution
- ☐ j. Radio coverage
- ☐ k. Television coverage
- ☐ l. Social media (Facebook, Twitter, etc.)
- ☐ m. Blog
- ☐ n. Other—please specify:

Focus groups, mass media.	Utah
TSM meetings.	Arizona

☐ **o. Other—please specify:**

Public Announcements.	Illinois

Comments:

Agency is currently looking into social media as an outreach strategy.	Oregon

46. Has your agency targeted specific stakeholder groups such as businesses with mitigation efforts?

☐ **a. Yes**
☐ **b. No**

Comments:

No	All affected or potentially affected are considered.	Tennessee

If the answer to Question 46 is "No," then proceed to Question 49.

47. Please check those groups which your agency has targeted mitigation strategies/plans for dealing with their concerns: (Check all that apply.)

☐ **a. Businesses**
☐ **b. Residents**
☐ **c. Travelers**
☐ **d. Business deliveries**
☐ **e. Truckers**
☐ **f. Commuters**
☐ **g. Elected officials**
☐ **h. Recreationalists**
☐ **i. Sports fans**
☐ **j. Other—please specify:**

Schools.	Colorado
All.	Tennessee
See comments.	Pennsylvania

☐ **j. Other—please specify:**

Comments:

Various interest (such as bike/pedestrian, etc.) and environmental justice groups.	Oregon
Other groups taken into account are Emergency Management, School Districts, Hunting groups, Airports, Vacation Bureaus, and Live Entertainment.	Pennsylvania

48. Of these groups which are most important to deal with on your urban projects? (Check 3.)

- ☐ **a. Businesses**
- ☐ **b. Residents**
- ☐ **c. Travelers**
- ☐ **d. Business deliveries**
- ☐ **e. Truckers**
- ☐ **f. Commuters**
- ☐ **g. Elected officials**
- ☐ **h. Recreationalists**
- ☐ **i. Sports fans**
- ☐ **j. Other—please specify:**

☐ **j. other—Please specify:**

Comments:

None

49. What techniques are your agency using to effectively deal with stakeholder groups that you believe would be of value to other agencies?

Comment:

Alignment and coordination with local government agencies.	Oregon
Know Where Know Why—Advertising Campaigns and Programs.	Utah
# 45 A and C.	Colorado
Effective outreach/communication via media, print, radio.	Michigan
Citizen Advisory Committees and other stakeholder meetings.	Georgia
Virtual Public Meetings.	Missouri
Public meetings and discussions.	Tennessee
Techniques that have been effective are early communication with the stakeholder groups and local elected officials. The Department can learn the stakeholder's needs and explain how the project schedule will be managed daily and overall. Establish a community advisory committee for the project and continue meeting with this group as the project progresses. The Department has mass communication through state, local and project specific websites, emails, and travel alert subscriptions. We send out project newsletters, emails, and text messages. Also, we use the permanent overhead Intelligent Transportation Systems to relay messages. Parkway Permitting; The contractor has to submit approval application 3 days before they want to shut down a route. The traffic unit reviews for project specifics, conflict with other projects and special events in the area.	Pennsylvania
We bring stakeholders in very early in the process. In the case of elected officials, we send them email notifications including them in our design phase submittals.	Florida
Achieve consensus on major project issues before project approval.	San Francisco

Section 7—Media Relations

For the purpose of this survey media relations are those activities focused communicating with the media (e.g. television, radio, newspaper, etc.)

50. Does your agency assign a project-specific individual to its urban corridor projects for the purpose of managing media relations? (Check one.)

- ☐ **a. Never**
- ☐ **b. Sometimes**

- [ ] **c. Often**
- [ ] **d. Very often**
- [ ] **e. Always**

Comments:

Depends on Project Magnitude.	Utah
Usually the Project Manager, Community Relations Coordinator or District Press Officer.	Pennsylvania

If the answer to Question 50 is "Never," then proceed to Question 53.

51. Is this person an agency employee? (Check one.)

- [ ] **a. Never**
- [ ] **b. Sometimes**
- [ ] **c. Often**
- [ ] **d. Very often**
- [ ] **e. Always**
- [ ] **f. N/A**

Comments:

None

52. Is this person a private contractor? (Check one.)

- [ ] **a. Never**
- [ ] **b. Sometimes**
- [ ] **c. Often**
- [ ] **d. Very often**
- [ ] **e. Always**
- [ ] **f. N/A**

Comments:

Sometimes	They do not do direct media interviews but they have helped.	Michigan

53. Which of the following best describes your agency's view and relationship with the media? (Check one.)

- [ ] **a. The media is suspect and we don't interact with them any more than we have to**
- [ ] **b. The media isn't looking for good news so they never write or say positive things about our agency or projects**
- [ ] **c. The media has been neutral about our projects and largely ignore us**
- [ ] **d. The media has responded in a generally positive way to our efforts to work with them**
- [ ] **e. The media has been a strong partner in getting critical information to the public during construction**
- [ ] **f. Other—please specify:**

Comments:

B	The Community Relations Coordinator and District Press Officer work on these relationships. The media has 24/7 access to the press office. The Department is proactive, in keeping them informed so we get fair coverage. Overall, we have a good relationship.	Pennsylvania

B	Overall I think they are positive. Some outlets sensationalize but I don't think they are well respected in community.	Nevada

54. Which of the following strategies does your agency use to communicate information to stakeholder groups? (Check all that apply.)

- ☐ **a. Free "tags" on radio announcements such as traffic reports**
- ☐ **b. Paid "tags" on radio announcements such as traffic reports**
- ☐ **c. We rely on the radio to cover our projects when they have time and interest**
- ☐ **d. We rely on television stations to cover our projects when they have time and interest**
- ☐ **e. We purchase commercial time with radio stations**
- ☐ **f. We purchase commercial time with television stations**
- ☐ **g. Editorial board meetings**
- ☐ **h. We rely on the relationships we have with key media people to access their audiences and get our word out**
- ☐ **i. Other—please specify:**

Paid news ads to announce public meetings.	Oregon
Distribute news releases on major projects.	Massachusetts
Aggressive press releases, media tours.	Washington
Community meetings.	Illinois
PSA when available, Social Media activities, pitching feature.	Michigan
Website.	Tennessee
Public press releases.	Pennsylvania
Press Releases.	Nevada

- ☐ **j. Other—please specify:**

Cable TV within the project area(s), community.	Michigan
Additional signs in the project work zone with website information.	Pennsylvania
Provide free access to traffic video cameras.	New York

Comments:

Reached out to minority groups thru Spanish language ads, minority news publications including bidding opportunities.	Oregon
Very heavy use of media relations to keep our topics on construction projects in the news.	Georgia
Traffic information is supplied to the radio and TV from the Traffic Management Center.	Pennsylvania

55. Which of the strategies listed in Question 54 are most effective for your agency in getting information to your stakeholders? (Check no more than three.)

- ☐ **a. Free "tags" on radio announcements such as traffic reports**
- ☐ **b. Paid "tags" on radio announcements such as traffic reports**
- ☐ **c. We rely on the radio to cover our projects when they have time and interest**
- ☐ **d. We rely on television stations to cover our projects when they have time and interest**
- ☐ **e. We purchase commercial time with radio stations**
- ☐ **f. We purchase commercial time with television stations**
- ☐ **g. Editorial board meetings**
- ☐ **h. We rely on the relationships we have with key media people to access their audiences and get our word out**
- ☐ **i. Other—please specify:**

Unknown.	Illinois
Social Media techniques, project managers broadcast/print interviews.	Michigan

Website.	Tennessee
Video cameras	New York

☐ **j. Other—please specify:**

Comments:

Not sure.	Louisiana
Not sure.	Nevada

56. How did you know which ones to check in Question 55? (Check all that apply.)

☐ **a. Surveys of stakeholders**
☐ **b. Experience**
☐ **c. Informal statistics we keep based on calls to the agency**
☐ **d. Feedback from the media**
☐ **e. Public feedback at meetings**
☐ **f. Neighborhood groups**
☐ **g. Focus groups**
☐ **h. Recreationalists**
☐ **i. Sports fans**
☐ **j. Other—please supply:**

Event Managers.	Pennsylvania

☐ **j. Other—please supply:**

Comments:

None

57. What techniques are your agency using to effectively deal with media relations that you believe would be of value to other agencies?

Comment:

Strong public outreach strategies, public awareness/educational media events.	Oregon
# 55 H	Colorado
Agency media integrity with key reporters (one to one) ; Identifying Social Media techniques which will focus on the key objective to get the message to your customers; Developing an informative up-to-date website; Consistently on time with information that is correct and informative; Pitching projects with a predetermined goal and outcome desired....safety improvements, graffiti issues....etc.; Using “Old School Media” techniques for those that are not connected to the Internet...i.e.; local papers; supermarket free community papers/flyers with information and the theater pre-movie advertising.	Michigan
Building relationships, providing timely & reliable information, being accessible.	Georgia
Virtual Public Meetings.	Missouri
Have proactive interaction with the media; establish a good working relationship with them. Address issues immediately. Keep the media informed with daily email to press, radio, and TV. Have publicity visits or news conferences when appropriate. One district has developed a strong	Pennsylvania

relationship with media at the beginning of the construction season by guest speaking on a local talk radio show about the upcoming construction projects.	
When we have a large project or event, we will go to the media outlets and visit with them, explaining in detail our projects. We offer to take them on tours of our projects. Also, after sending press releases or media alerts, we also follow up with phone calls. We ultimately make ourselves available to the media, traveling to their stations to interview on various news programs, etc. In the Tampa Bay area, we have very good relationships with all the reporters and they know they can call us for story ideas and in turn, we can call them and pitch ideas which usually get covered. We are respectful of their deadlines and they appreciate it.	Florida
Create a division within ADOT that deals specifically with communication and community partnerships—media relations is a big part of this.	Arizona
We have used lots of corridor-specific websites which have been very effective.	California

Section 8—Intermodal Issues

58. How often are other modes (e.g., transit, bicycle, pedestrian) present in your congested urban corridor projects? (Check one.)

- ☐ **a. Never**
- ☐ **b. Sometimes**
- ☐ **c. Often**
- ☐ **d. Very often**
- ☐ **e. Always**

Comments:

D	We determine impacts to all modes including bike/pedestrian and detours and mitigate as appropriate.	Oregon

If the answer to Question 58 is "Never," then proceed to Question 60.

59. If other modes are present in your urban corridor projects what measures do you take to address their operations before construction? (Check all that apply.)

- ☐ **a. Coordination with other modes during the planning process**
- ☐ **b. Coordination with the other modes during the engineering design process**
- ☐ **c. Permanent ongoing meetings/committees with transit agencies**
- ☐ **d. Permanent ongoing meetings/committees with bicycle and pedestrian groups**
- ☐ **e. Project specific meetings/committees with transit agencies**
- ☐ **f. Project specific meetings/committees with bicycle and pedestrian groups**
- ☐ **g. No meaningful coordination**
- ☐ **h. No coordination is necessary**
- ☐ **i. Our agency uses in-house staff who knows about the other modes so no external coordination is necessary**
- ☐ **j. Other—please specify:**

US Coast Guard.	Oregon
Work with local Municipal Planning Organization.	Pennsylvania

- ☐ **k. Other—please specify:**

Comments:

2	Close coordination with transit on longer duration projects or dealing with special events.	Washington
2	Project specific. Rare and infrequent.	Indiana

60. Do you rely on the other modes to assist with throughput in the urban corridor during construction? (Check one.)

- ☐ **a. Never**
- ☐ **b. Sometimes**
- ☐ **c. Often**
- ☐ **d. Very often**
- ☐ **e. Always**

Comments:

2	It seems heavy messaging, combined with alternate routes (signed or discovered) are the most common.	Washington

61. How effective are the other modes in diverting traffic from automobiles and relieving congestion pressure during construction of your urban corridors? (Check one.)

- ☐ **a. Not effective at all**
- ☐ **b. Some effectiveness**
- ☐ **c. Moderate effectiveness**
- ☐ **d. Very effective**
- ☐ **e. Not applicable**

Comments:

Engaging key stake holders early and often in all phases of a project.	Oregon
Coordination between modes.	Utah
# 59 A to F	Colorado
Coordination/Changeable message signs/Public info about other modes during construction or major events.	Georgia
Provide additional funding to transit agency to relieve congestion during construction.	Missouri
Van/car pooling, bus.	Tennessee
Meet with the other transportation modes before, during and after a project to make sure their needs are/or have been met with the temporary and final project. The other transportation modes are invited to planning meetings. Their issues are represented by the Metropolitan Planning Organizations. MPOs are invited to meetings that cover overall and specific projects.	Pennsylvania

62. What techniques are your agency using to effectively deal with other transportation modes that you believe would be of value to other agencies?

Comment:

None

Section 9—Traffic Management Issues

63. What strategies does your agency use to manage traffic during construction of projects in urban corridors? (Check all that apply.)

- ☐ **a. Partial closures during the day**
- ☐ **b. Partial closures during the night**

- [ ] c. Full closures during the day
- [ ] d. Full closures at night
- [ ] e. Aggressive detour routing
- [ ] f. Some detour routing
- [ ] g. Lane rental specifications
- [ ] h. Penalties for late opening of closures
- [ ] i. Milestones and/or construction phasing
- [ ] j. Contractor developed traffic control plan
- [ ] k. Agency developed traffic control plans
- [ ] l. Contractor provided traffic control
- [ ] m. Agency provided traffic control
- [ ] n. Use of in-place ITS resources
- [ ] o. Use of temporary ITS resources provided by the agency
- [ ] p. Use of temporary ITS resources provided by the contractor
- [ ] q. Other—please specify:

Motorist assistance patrols.	Louisiana
Have utilized full or significant closures for extended periods. Heavy media push required prior.	Washington
Full weekend closures.	Oregon
Weekend work.	Tennessee
Contractor has a traffic control person, who is on call 24/7.	Pennsylvania
Contractor provides full time traffic control coordinator to monitor traffic inside the project insuring safety and mobility.	Arizona
TMP Working Group made up of all area agencies and stakeholders to plan and monitor traffic management	San Francisco

- [ ] r. Other—please specify:

Off-duty uniformed police at traffic signals and along detours.	Pennsylvania

Comments:

64. What techniques are your agency using to effectively deal with traffic management that you believe would be of value to other agencies?

Comment:

Utilization of traffic management plan and the web based work zone traffic analysis tool. Full closure during weekends.	Oregon
All of # 63 except C.	Colorado
Heavy outreach to communities and media prior to any significant closure.	Washington
Full weekend closures with coordination from Traffic Operations center.	Oregon
We are aggressively deploying “temporary” ITS devices, and tie them in to our permanent system, so traffic can be managed through a team effort between project staff and TMC staff.	Michigan
Customer satisfaction surveys.	Missouri
Rolling road blocks using state police approaching traffic control zones. Ramps are shut down while this is happening.	Pennsylvania
(see questions 63)	Arizona
TMP Working Group made up of all area agencies and stakeholders to plan and monitor traffic management	San Francisco
Communication, communication, communication.	New York

65. Given that traffic control and management are a substantial cost element for urban projects, how has your agency endeavored to reduce these costs?

Comment:

Reduce contract time.	Louisiana
Coordination and collaboration with other agencies, constructability review, alternative contracting, etc.	Oregon
Allowed contractor to produce TC plans, thus only designing the plan once.	Utah
VMSs, Alternate Route Advisories.	Colorado
See #64.	Oregon
Shorten duration of projects as much as possible.	Minnesota
Phase project to minimize temporary pavement and reduce the number of phase changes.	Indiana
Trying to use standardized special provisions for all work zone management approaches: “traditional” approaches, as well as “new” SPs (such as real-time work zone systems, etc.).	Michigan
Reducing total construction duration to the shortest time practical.	Georgia
Low bid specifications.	Ohio
Gateway Guide.	Missouri
Traffic Management Plans use phasing for traffic control to reduce project impact. Plans are value engineered and have constructability reviews to verify efficiency. Internal coordination with design and construction units when developing the TMPs. Traffic control phasing developed with construction input. Road Users Liquidated Damages is balanced with actual construction schedule.	Pennsylvania
Attempts to lower these costs have been mostly with A+B with I/D and DB with I/D or bonus.	Florida
Allow nighttime full closures. We realize that safety to the traveling public is very important and insure monies are available to administer and manage this.	Arizona
Work zone project reviews as described in question 22.	New York
We don't. We are much more concerned that efforts be effective.	San Francisco

66. Do you have a project that would be useful to share with other agencies that we could explore in greater detail as a case study for this research project?

If yes, please provide a name and contact information below so we can follow up with that individual.

- ☐ **a. Yes**
- ☐ **b. No**
- ☐ **c. Not sure**

Name:

Phone:

Email:

67. Does your agency have or use a traffic management center (TOC, TMC) to help deal with project and program travel demand management?

- ☐ **a. Yes**
- ☐ **b. No**

Comments:

Traffic Management and Operations Center.	Oregon
In Region 1.	Oregon
At the local level (in the city).	Ohio
The individual Districts have Traffic Management Centers that are operational during the work day and then switch over to a regional Traffic Management Center for the remaining portion of the day. Coverage is 24/7.	Pennsylvania
One in Las Vegas. Just developing one in Reno.	Nevada

68. What has your agency done to comply with the Federal regional mobility requirements for coordination of program within urban areas?

Comment:

Implementation of Highway Mobility policy and statewide freight/traffic mobility program; use Traffic Management Plans including meeting delay thresholds on corridor basis.	Oregon
Not sure.	Utah
Drafted Specifications to comply with all Federal Regulations.	Colorado
Developed internal policies.	Illinois
Rewritten design and procedural manuals.	Indiana
Not sure if we have done anything above and beyond are work zone mobility process; we already have pretty good coordination, using our MPO SEMCOG as the coordinating unit, with coordinating work zone mobility.	Michigan
Coordination with local FHWA, and others to ensure compliance with all requirements.	Ohio
Traffic Management Centers in St. Louis, Kansas City, and Springfield.	Missouri
Not sure what you are asking here.	Pennsylvania
Intensive planning and coordination efforts within the Department's Transportation Planning Office.	Florida
Work Zone Safety and Mobility policy implemented on 10/07.	Arizona
Work with, and as part of the MPO. ADA plan.	New York
Follow state DOT guidelines	San Francisco

Other Comments

If you have any other comments, please include them below:

Comment:

Project specific water quality/detention treatment within limited right-of-way, noise impacts, projects associated with railroads can further complicate the delivery of the projects.	Oregon
This survey is too long, and required a lot of research. It took about two hours to get all the information from all the Specialty Groups. It definitely needs re-evaluated.	Colorado
Please let me know when you publish your results. Thank you.	Pennsylvania
For case study project I would need to discuss with our regional offices for potential projects.	New York

Abbreviations used without definitions in TRB publications:

AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transport Association
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation