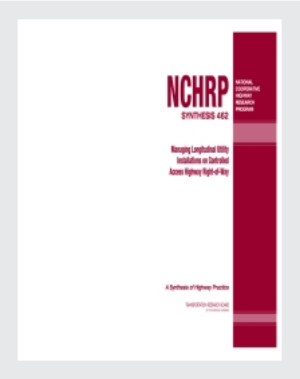

Managing Longitudinal Utility Installations on Controlled Access Highway Right-of-Way

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SYNTHESIS 462

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Managing Longitudinal Utility Installations on Controlled Access Highway Right-of-Way

A Synthesis of Highway Practice

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NCHRP **SYNTHESIS 462**

Managing Longitudinal Utility Installations on Controlled Access Highway Right-of-Way

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.

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The needs for highway research are many, and the National Cooperative Highway Research Program can make significant contributions to the solution of highway transportation problems of mutual concern to many responsible groups. The program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

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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 Tanya M. Zwahlen
Consultant
Transportation
Research Board

This report compiles and documents information regarding the management of longitudinal utility installations on controlled access highway right-of-way. A primary objective of this research is to identify exemplary practices that may help highway officials implement innovative policies and strategies to accommodate and manage utility installations.

Information used in this study was acquired through a review of the literature and a survey of representatives in all states.

Edgar Kraus, Texas A&M Transportation Institute, San Antonio, Texas, 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 with 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

Note: Many of the photographs, figures, and tables in this report have been converted from color to grayscale for printing. The electronic version of the report (posted on the web at www.trb.org) retains the color versions.

MANAGING LONGITUDINAL UTILITY INSTALLATIONS ON CONTROLLED ACCESS RIGHT-OF-WAY

SUMMARY

The objective of this report is to survey state departments of transportation (DOTs) to identify and synthesize exemplary practices to help highway officials manage longitudinal utility installations on controlled access highway right-of-way. For this project, controlled access highway right-of-way is defined as right-of-way for interstates, freeways, expressways, and freeway/expressway mixes (hybrids). For the remainder of the report, the term "controlled access highway right-of way" was shortened to "controlled access right-of-way" to improve readability. In the survey, the study team included the following topics of special interest:

- Information about the use of utility corridors by DOTs to accommodate utility facilities longitudinally on controlled access right-of-way. For this study, a utility corridor is defined as a specified zone within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice.
- Mechanisms that state DOTs use to acquire right-of-way jointly with utility owners for the use of utility facilities.
- Additional innovative policies, strategies, and practices to accommodate and manage longitudinal utility facilities on controlled access right-of-way.

The focus of the synthesis was longitudinal utility installations on controlled access right-of-way. With the exception of utility corridors, the synthesis did not focus on utility crossings, as these installations have been traditionally allowable under AASHTO and FHWA policies.

An online survey of U.S. state DOTs was undertaken. All voting members of the AASHTO Subcommittee on Right of Way, Utilities, and Outdoor Advertising Control to were asked to participate. The survey results were complemented with a literature review and information available from select DOTs that have experience with or use innovative practices of particular interest to this project.

The survey questionnaire (Appendix A) consisted of 11 primary questions, several of which included additional related questions. Depending on their responses to the primary questions, survey participants answered up to 23 questions. Appendix B provides a detailed overview of responses to each question, while Appendix C quotes some of the actual responses given by participants. The TRB study coordinator sent the survey to 85 email addresses on February 20, 2013. The survey was closed on April 1, 2013, with 43 of 51 DOTs having responded; a response rate of 84%.

Beginning in 1988, federal regulations allowed states to establish their own utility accommodation policies; since then, more and more states have allowed the longitudinal accommodation of utilities on controlled access right-of-way. On the highway right-of-way of a federal-aid or direct federal project, the accommodation of a utility facility that serves the public can be accommodated under the state DOT's approved utility accommo-

dation policy and should not conflict with the provisions of federal, state, or local laws and regulations. If such facilities will serve a private or proprietary interest, they might still be accommodated; however, they would have to be approved under the leasing requirements in the state DOT's approved right-of-way manual. According to recent surveys, at least 45 of 51 DOTs (88%) manage longitudinal utility installations on controlled access right-of-way.

In most states, the state accommodation rule or policy is a source of these management procedures, but only 10 DOTs cited it as their only source. Twenty-three DOTs use the rules in combination with one or more additional documents, such as a state utility manual or state permit manual, the *FHWA Utility Guide*, the current AASHTO accommodation policy, or specialized state guidelines.

Of the 43 DOTs that responded, seven reported that their state uses procedures that are not published in policies or statutes to manage utility installations on controlled access right-of-way. A common element among these responses was that processes can be influenced by local circumstances. For example, larger or more populous districts may have more staff and more requests for certain types of utility installations, which may result in different processes to manage them.

Some states mentioned that they encourage utility owners to use shared trenches and/or conduit during construction; however, some noted that although shared trenching is a great idea in theory, this type of coordination can be very challenging and might not be successful in the field. Similarly, some states ask utility owners to share a certain area of the right-of-way; for example, an area within a certain distance of the right-of-way line (e.g., 15 ft). The zone might not be required by law but could be an accepted engineering practice.

DOTs report few differences in procedures for urban versus rural management practices. Only two DOTs (Virginia and Wisconsin) reported that they manage these utilities differently, and both provided some examples. Urban areas often have different requirements owing to work restrictions and traffic concerns that might translate into different accommodation procedures.

The development of procedures and processes is typically a DOT internal activity that occurs with some input from utility owners. DOTs that allow some type of input mentioned the state rulemaking process as one option for utility owner input. Several DOTs mentioned reaching out to utility owners for feedback on rules and participating in joint committees or councils between DOTs and utility owners.

Most states have a process that allows utility owners to propose the location of their facilities in the right-of-way during utility permitting. Most DOTs use a process that is similar to installations in noncontrolled access right-of-way but involves more scrutiny and a more detailed review. States that have approved only a few longitudinal installations on controlled access right-of-way may have approval procedures that vary considerably from case to case (depending on the circumstances of the installation) and are handled on a case-by-case basis.

Utility permits are typically reviewed at the local or regional level. A central office often gets involved if the utility installation is unusual or requires some type of compensation. Some DOTs route permit requests through various divisions for comment. This process is time-consuming, and it may be several months until all divisions involved have reviewed the permit request. Other DOTs have a review committee (e.g., a shared resource committee or board of public works) that reviews the corridor locations utility owners have requested.

In some states, occupancy of utility facilities on controlled access right-of-way occurs via a resource sharing (or shared resources) agreement. In practice, one or more utility owners will propose a utility corridor by submitting preliminary plans to the DOT. The DOT con-

ducts a site review, may request that facilities be located as close to the right-of-way line as possible, and requests final plans. Once the utility owner provides the final plans, the DOT reviews them and comes to a decision.

States that allow electric transmission line installations on controlled access right-of-way reported that this type of utility installation usually requires several meetings with the utility, the DOT, and possibly other agencies (such as the public service commission) to determine a final corridor location. Once all parties agree on the location, the DOT works with the utility owner on the details of the final design alignment.

The study team defined a utility corridor as a specified zone within the right-of-way in which multiple longitudinal utilities are required to be located by agency policy or practice. Of 39 DOTs responding, 15 reported that they use this type of utility corridor, while 24 said they do not. Of the states that use utility corridors, six DOTs commented on the definition provided, and three (South Dakota, Texas, and Utah) provided their own definitions. Utah uses the designation "generalized corridor" and specifies that it be located in an area as close to the right-of-way line as possible; not underneath the pavement or in the median, and with access points located outside access control limits. Texas uses the designation "utility strip," defined as "the area of land established within a control of access highway, located longitudinally within the area between the outer traveled way and the right-of-way line, for the nonexclusive use, occupancy, and access by one or more authorized public utilities." The South Dakota DOT defines a utility corridor as "an easement other than right-of-way for multiple utilities to occupy."

Few states commented on the purchase of additional right-of-way for use by utilities. Ohio said it will purchase additional right-of-way if it is available. South Dakota makes use of utility corridors in situations where utility relocations will be accelerated by purchasing an easement. Common scenarios are projects that have multiple utility owners with adjustment costs that are eligible for reimbursement, projects that have utility adjustments in a location where utility owners have experienced difficulties with the acquisition of easements from private landowners, and projects with little space for utility installations on the proposed extent of the right-of-way.

Thirteen states reported that they use utility corridors for longitudinal installations; six of these also use utility corridors for crossings. Idaho reported that it uses utility corridors for transverse crossings only.

Differences in the way longitudinal utility corridors are implemented by DOTs were noted. Several DOTs mentioned that they establish utility corridors by moving the access control line from the right-of-way line inward to provide an area for utility installations between the two. States that move the access control line may also move the security fence (sometimes called limited access right-of-way fence or access control fence) so that utility installations are outside the security fence but within the state right-of-way.

Other states leave the access control line in place and instead put a utility access control line or utility access denial line between the right-of-way line and the proposed installation. When this method is used, access control remains unaltered and security fences do not need to be moved. The utility access control line prohibits the utility owner from accessing a utility line directly from the main roadway. To access a utility for maintenance purposes, the owner must enter the corridor at specially marked locations that are often located at interchanges. Leaving the utilities clearly inside the controlled access right of-way and within the security fence might also make it easier for a DOT to ensure that the utility does not provide service connections from within the controlled access right-of-way.

Issues with the accommodation of longitudinal utility installations on controlled access right-of-way during both regular permitting and project development are similar to the issues DOTs have with utility installations on noncontrolled access right-of-way. The safety of the traveling public and potential effects on the road level of service during installation and maintenance activities were frequently mentioned, as were issues with utility coordination during project development. Issues that appear unique to longitudinal accommodation on controlled access right-of-way are the valuation and appraisal of occupying the right-of-way itself, especially in shared resource agreements or in less common cases, such as occupying scenic easements. Some DOTs noted increasing political pressure to allow the longitudinal occupation of controlled access right-of-way by utilities other than communication lines.

DOTs mentioned several exemplary practices to deal with the accommodation of longitudinal utility installations on controlled access right-of-way, including centralized review committees, shared resource agreements, electric transmission lines on controlled access right-of-way, joint trenching, utility corridors, electronic permitting systems, and cooperative right-of-way acquisition. DOTs also offered some general recommendations, such as starting utility coordination activities early in the design process to ensure sufficient time to evaluate and implement accommodation strategies.

Several DOTs mentioned that shared resource agreements have worked well in their states. Installations may involve conduits that allow future expansion for other communication utilities. Some states have accepted access to a fiber network or "dark" fiber (i.e., installed but unused fiber) in lieu of a cash payment. DOTs use the fiber to connect intelligent transportation system (ITS) facilities such as changeable message boards, ramp meters, and traffic cameras.

The vast majority (88%) of DOTs actively manage longitudinal utility installations on controlled access right-of-way; however, no two states take the same approach to including utility owners in developing procedures for managing the installation process. Some states proactively engage utility owners, which can avoid conflict later in a project, when delays owing to miscommunication can be costly. Managing stakeholder relationships so that all public utility owners are treated fairly can be challenging, especially as some utilities—such as those involving renewable energy sources—have not yet been significantly addressed by most DOTs' policies. Only Minnesota reported that it is reassessing its accommodation policy regarding renewable energy sources.

The most effective agencies strike a balance among minimizing costs associated with securing right-of-way, accommodating increasing mobility needs with finite resources, and ensuring travelers' safety to the greatest extent possible. Communication among stakeholders is key to achieving these sometimes competing goals. Certain tools (e.g., shared resource agreements and cooperative committees formed by representatives of stakeholder groups) can facilitate communication by ensuring that all parties are informed as a project develops. These committees can also help mitigate political pressures that might arise during a project.

Installing utilities on controlled access right-of-way corridors requires that DOTs think strategically—before, during, and after the project—with the overarching goals of achieving the most efficient installation possible without compromising safety, spending no more public dollars than necessary (i.e., proactively engaging stakeholders and managing the process), and balancing the needs of the traveling public with the rights of utility owners.

CHAPTER ONE

INTRODUCTION

STUDY PURPOSE AND OBJECTIVES

The objective of Synthesis 20-05/Topic 44-11 is to survey state DOTs to identify and synthesize exemplary practices to help highway officials manage longitudinal utility installations on controlled access highway right-of-way. In the context of this project, controlled access highway right-of-way is defined as right-of-way for interstates, freeways, expressways, and freeway/expressway mixes (hybrids). For the remainder of the report, the authors have shortened the term "controlled access highway right-of way" to "controlled access right-of-way" to improve readability. In the survey, the study team included the following topics of special interest to the project panel:

- Information about the use of utility corridors by state departments of transportation (DOTs) to accommodate utility facilities longitudinally on controlled access right-of-way. In the context of this study, a utility corridor is defined as a specified zone within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice.
- Mechanisms that state DOTs use to acquire right-of-way jointly with utility owners for the use of utility facilities.
- Other innovative policies, strategies, and practices to accommodate and manage longitudinal utility facilities on controlled access right-of-way.

The focus of the synthesis was longitudinal installations on controlled access right-of-way. With the exception of utility corridors, the synthesis did not focus on utility crossings, as these installations have been traditionally allowable under AASHTO and FHWA policies.

The study also reviewed the extent to which DOTs have begun implementing recommendations from several relevant scans, including the 2006 domestic scan on right-of-way acquisition and utility relocation, and the 2008 international scan on streamlining and integrating right-of-way and utility processes. In addition, an overview of current and innovative practices to manage utilities in state DOT right-of-way was developed and highlighted examples of the successful implementation of new and innovative practices. This synthesis helps highway officials better manage utilities on controlled access right-of-way using identified exemplary practices.

STUDY APPROACH

The study team conducted an online survey of U.S. state DOTs. The team invited all voting members of the AASHTO Subcommittee on Right of Way, Utilities, and Outdoor Advertising Control to participate in the survey. The survey results were complemented with information available from select DOTs that have experience with or use innovative practices of particular interest to this project.

In addition to the survey, the project gathered information through a literature review of relevant international and domestic documents that describe procedures for utility corridor management on controlled access right-of-way. The study team gathered information about the following topics:

- Innovative procedures and technologies used to manage utilities on controlled access right-of-way.
- Management of requests from utility owners for future accommodations.
- Establishment, delineation, coordination, sharing, and control of utility corridors.
- Innovative state practices regarding longitudinal utility accommodations.
- Innovative state statutes, regulations, and practices that address revenue generation, barter, cooperative right-of-way acquisition, safety requirements, and utility collocation.
- State policies and procedures that manage special conditions, such as renewable energy.

REPORT ORGANIZATION

This report describes the procedures and findings of the project and is organized into four chapters:

- Chapter one is this introductory chapter.
- Chapter two provides a brief historical background of longitudinal utility installations on controlled access right-of-way and the current practices DOTs use to manage these utilities.
- Chapter three provides an overview of stakeholder recommendations, exemplary practices, and implementation experiences based on feedback provided by survey participants.

- Chapter four provides conclusions and recommendations for future research.

In addition, the report contains three appendices:

- Appendix A is a copy of the survey questionnaire.
- Appendix B provides a detailed discussion of survey results.
- Appendix C provides a list of state utility accommodation documents and quotes specific participant responses to the survey.

CHAPTER TWO

STRATEGIES FOR MANAGING UTILITIES ON CONTROLLED ACCESS RIGHT-OF-WAY

HISTORICAL BACKGROUND

It is in the public interest for utility facilities that serve the public to be accommodated on highway right-of-way when such use and occupancy do not adversely affect the primary function of the highway facility; do not degrade traffic safety or otherwise impair the highway or its aesthetic quality; and do not conflict with the provisions of federal, state, or local laws or regulations (*1*). DOTs typically charge nominal or no fees for the accommodation of public utilities in public right-of-way, and many utilities take advantage of the free real estate. Space to accommodate those utilities is usually limited, especially in urban areas.

Utility accommodation rules and guidelines throughout the United States are the result of a federal mandate that requires states to submit a statement to FHWA on the authority of utilities to use and occupy the state highway right-of-way, the power of the DOT to regulate such use, and the policies the DOT uses to accommodate utilities within the right-of-way of federal-aid highways under its jurisdiction (*2*). The rules, which are based on utility accommodation policies and FHWA and AASHTO guides, prescribe minimums relative to the accommodation, location, installation, adjustment, and maintenance of utility facilities within the state right-of-way (*3*, *4*). In many states, if industry or government codes, orders, or laws require utilities to provide a higher degree of protection than that provided in the state's utility accommodation rules, such regulations and laws take precedence.

In addition to AASHTO's utility accommodation policy, several other documents provide guidance to DOTs concerning the accommodation of utility facilities on the highway right-of-way. Among these are AASHTO's guidance on accommodation of telecommunication utilities (*5*), AASHTO's policy on geometric design (also known as the "Green Book") (*6*), AASHTO's roadside design guide (*7*), and FHWA's guidelines on utility relocation and accommodation (*8*, *9*).

As part of a previous study (*10*, *11*), members of the study team completed a literature review of utility accommodation practices and optimization strategies. The Federal-Aid Highway Act of 1944 established a National System of Interstate Highways and substantially increased the amount of federal-aid funds available to the states (*12*). The act required the development of new standards for design and control; in response, the American Association of State Highway Officials (AASHO) developed the 1945 *Design Standards for the National System of Interstate Highways* (*13*). In 1946, the Public Road Administration issued General Administrative Memorandum No. 300, which contained detailed working procedures and requirements to implement the 1944 act (*14*).

As the number of highway improvement projects increased, so did the number of utility relocations, which resulted in objections from the utility industry regarding why the industry should have to bear the costs associated with the relocations (*15*). In response, the Federal-Aid Act of 1954 directed the Secretary of Commerce to study the impact of utility relocations on highway construction projects (*16*, *17*). Two years later, the Federal-Aid Highway Act of 1956 renamed the National System of Interstate Highways as the National System of Interstate and Defense Highways (the Interstate system) (*18*). The act called for the establishment of geometric and construction standards for the Interstate system; in response, AASHO developed the 1956 *Geometric Design Standards for the National System of Interstate and Defense Highways* (*19*).

To establish a uniform national policy for the implementation of the Federal-Aid Act of 1954, AASHO developed the 1959 *Policy on the Accommodation of Utilities on the National System of Interstate and Defense Highways.* The policy strongly discouraged longitudinal installations but allowed crossing of utilities (*20*). The Surface Transportation Assistance Act of 1978 stated that utility use of right-of-way on federal-aid highways should not be permitted if the use would adversely affect safety, but recognized potential adverse effects of prohibiting such use (*21*). In the 1982 update of the utility policy, the renamed AASHTO reiterated the limitation of utility installations to extreme cases but provided for the consideration of factors to evaluate potential exceptions.

CURRENT REGULATORY FRAMEWORK

Owing to DOT concerns about the restrictive utility accommodation policy, in 1988 FHWA revised the regulation that mandated DOT adherence to the AASHTO policy, allowing each state to adopt its own policy (*22*). Until 1988, DOTs

were required to follow the 1982 AASHTO policy, which did not permit any utility installations that would adversely affect the safety of the traveling public. As a result, only a few longitudinal utility installations took place before 1988 on a small number of controlled access highways that were individually approved by FHWA. AASHTO's 1989 update to its utility policy continued to prohibit longitudinal utility installations on controlled access highways except for strictly controlled situations. However, DOTs were no longer mandated to adhere to the policy, and FHWA did not adopt the policy as a federal standard.

Today, all state DOTs have utility accommodation policies that have been approved by FHWA. Some states follow the restrictive AASHTO policy, while others have made it easier to install longitudinal utility facilities on controlled access right-of-way. States may determine whether or not to allow longitudinal utility installation on controlled access right-of-way and may specify the conditions under which installations are allowable. A state may allow certain utilities and exclude others or prohibit all utilities, as long as the action is properly documented in the state's utility accommodation policy. States may also charge fees or enter into shared resource agreements for utility access to controlled access right-of-way.

FEDERAL GUIDANCE ON USE OF HIGHWAY RIGHT-OF-WAY

FHWA has determined that it is in the public interest for utility facilities to be accommodated on the highway right-of-way of a federal-aid project when such use and occupancy do not adversely affect highway or traffic safety; impair the highway or its aesthetic quality; or conflict with the provisions of federal, state, or local laws and regulations (*1*, *23*). FHWA regulations allow utility use of the right-of-way of federal-aid or direct federal highway projects, provided adequate space is available to locate the utility facilities in a manner that does not interfere with the safe and efficient operations of the highway. These regulations also provide a process that public utilities must follow to be permitted to longitudinally occupy the right-of-way in a manner that is safe for the traveling public. To the extent that any such facilities serve the public, they can be accommodated under the DOT's approved utility accommodation policy. If such facilities are to serve a private or proprietary interest, they might still be accommodated; however, they would have to be approved under the airspace leasing requirements of 23 CFR 710 Subpart D (*24*). Thus, the distinction between public or private use is critical to determine which regulations apply to the accommodation of a particular utility facility.

FHWA regulations provide some criteria that state accommodation policies should include to regulate utility access to controlled access right-of-way (*22*). State accommodation policies should address the following items:

- The effects of utility installations on highway safety.
- The direct and indirect environmental and economic effects of any loss of productive agricultural land.
- The effects on existing and new security fences. Specifically, the state DOT should strive to retain existing security fences, and new security fences should be located at the right-of-way line, except for freeway sections that have frontage roads.
- The establishment of utility strips. Specifically, these should be established along the outer edge of the right-of-way by locating a utility access control line between the proposed utility installation and the through roadway and ramps, and should not allow service connections. According to the definition in the federal regulations, utility strips are similar to utility corridors as defined in this study.

A DOT with an accommodation policy that follows the regulations of 23 CFR 645 and is approved by FHWA does not need to obtain prior concurrence from FHWA to approve utility installations on controlled access right-of-way, as long as the DOT applies its policy (*25*).

CURRENT PRACTICES AT STATE DEPARTMENTS OF TRANSPORTATION

DOT accommodation policies vary in how they manage utilities on controlled access right-of-way, but they have many similarities rooted in common accommodation policies of the past. For example, DOTs usually allow crossing of controlled access right-of-way if the utility owner adheres to state standards such as encasement, depth of cover, or right angle to centerline. Maintenance is usually allowed only from outside the right-of-way. In general, states do not allow the longitudinal installation of utilities along controlled access highways. However, since the federal policy change in 1988, many states have implemented programs that allow certain classes of utility facilities on controlled access right-of-way, including communication lines and (less frequently) electric transmission lines.

State administrative codes usually outline requirements for variances or exceptions to general policy. Acceptable reasons for an exception often include extreme hardship or unusual conditions. To qualify for an exception, the utility owner usually must demonstrate the following:

- Accommodating the utility will not adversely affect the safety, design, construction, operation, maintenance, stability, or future expansion of the highway.
- Construction or maintenance will not require direct access from the main lanes of a freeway or connecting ramp.

- Any alternative location would be contrary to the public interest.

The number of installations of utilities on controlled access right-of-way is low; exceptions to policy are usually very difficult to obtain and often require a review by a division administrator, the state transportation commission, or the transportation secretary's office. An exception may be granted if the applicant can demonstrate that denying the accommodation would impose an extreme hardship on the utility owner or the customer. If an exception is denied, there is usually little chance for appeal.

Communication Lines and Shared Resources

Unlike other types of utilities, communication lines have been allowed longitudinally on the controlled access right-of-way of many states since the policy change of 1988. *NCHRP Synthesis 224* in 1996 noted that compared with other utilities—such as natural gas, petroleum, and water—fiber-optic lines do not pose a threat of explosion or damage to the highway and can be buried at the outer edge of the controlled access with little or no need for maintenance (*26*). In the early 1990s, many DOTs were concerned that if communication lines were allowed on controlled access right-of-way, it would become more difficult to restrict access to other types of utilities. In 1995, a policy resolution by the AASHTO Board of Directors acknowledged a distinction between buried fiber-optic cables and other types of utilities, and found it permissible to allow longitudinal fiber-optic installations while prohibiting other types of utilities (*27*).

From a federal point of view, it is crucial to determine whether the communication provider under consideration for longitudinal accommodation along controlled access right-of-way is a public or private utility. Federal regulations distinguish between "utility facilities" and "private lines," and different federal procedures apply (*28*).

To allow longitudinal communication use of controlled access right-of-way, many states have developed programs that allowed resource sharing agreements with utility owners. Sharing resources in this context means that the DOT provides access to controlled access right-of-way and, in return, receives some compensation from the utility owner. Compensation under these provisions can be of various types, including

- Cash payment(s).
- Shared use of a communication facility (lit fiber/equipment or services).
- An indefeasible right of use to dark fiber (i.e., installed but unused fiber).

Compensation to the DOT must be defined in an agreement between the DOT and the utility owner. Typically, these agreements must cite the benefit to the DOT; must comply with the DOT's safety, maintenance, operation, and beautification objectives; and must allow the DOT to maximize revenue from its assets.

The 1996 NCHRP Synthesis found that 12 states allowed longitudinal utility installations on controlled access right-of-way and 39 did not (*26*). An FHWA study the same year found that nine states charged a fee for the occupation of state right-of-way by utilities (*29*). The annual or annualized fees per mile varied from $736 in rural areas to $7,500 in urban areas. The study also described four legal forms DOTs could use to allow such occupancy by utility owners: easement, lease, franchise, and license. And it mentioned various procedures states use to determine the value of occupying the right-of-way, including the following:

- Competitive auction.
- Valuation of adjacent land.
- Cost of next best alternative.
- Needs-based compensation.
- Historical experience.
- Market research.

In 2002, FHWA published a report on resource sharing of fiber-optic and wireless utility facilities between DOTs and utility owners (*30*). According to the report, 30 states allow fiber-optic installations, and 14 allow wireless installation on controlled access right-of-way. Of the 30 states that allow fiber-optic installations, nine allow installations only for DOT purposes; for example, incident management systems and other ITS applications. These nine states do not participate in resource sharing, because the utility serves only the DOT. Of the states that allow wireless installations, only one allows installations for DOT purposes only.

One year later, in March 2003, AASHTO surveyed members regarding whether they allow wireless installations within controlled access right-of-way (*31*). Thirty DOTs responded: 12 allow wireless installations on controlled access right-of-way, and 18 do not. Of the 12 states that allow access, eight do not allow access to the facilities from the traveled lanes, while four allow access only in extreme situations when no other access was feasible.

In 2006, FHWA published a clearinghouse report based on a 2005 AASHTO survey of its members that asked (1) whether states allow communication lines on controlled access right-of-way, (2) whether states charge a fee or receive compensation for these installations, and (3) the cost basis for the fee (*32*). Twenty-three states responded; 14 said they do allow such installations. Twelve of these states reported that they receive some kind of compensation from the utility, which may be based on any of the following:

- Annual or one-time fees (typically fixed, per foot, or per conduit).

- Barter arrangements.
- Fair compensation.
- Negotiation.

Between 2002 and 2006, four additional states (Massachusetts, Nevada, Utah, and Washington) reported that they allow communication lines on controlled access right-of-way. Assuming that the original 30 states did not change their policies, a total of 34 states allowed communication lines in 2006.

According to the 2006 report, states use various processes to value and appraise the occupation of the right-of-way by utility owners. For example, Colorado and Maryland receive compensation specific to each project based on the appraised value of the right-of-way. In Colorado, wire line installations pay once, while wireless utilities pay an annual fee. Illinois uses independent appraisals to determine the right-of-way's fair market value for a lease. This results in an annual fee of about $2,000 per mile, which can be higher in urban areas and lower in rural areas. Louisiana charges a one-time fee of $5,000 per mile, which can be paid by providing equivalent access to communication networks.

In 2007, the AASHTO Subcommittee on Right of Way and Utilities conducted a survey of its members, asking whether DOTs "allow linear placement of utilities in state DOT rights of way" (*33*). The purpose of the survey was to determine whether DOTs allow such use, whether they require compensation for such use, how the amount of such compensation is determined, and what legal instrument DOTs use. Twenty-four DOTs responded to the survey; all reported that they allow utilities to occupy state DOT rights-of-way. Some of the DOT comments provided information about states that allow utilities on controlled access right-of-way. All of these states had reported in 2006 that they provided access, so no new states allowed communication lines on controlled access right-of-way in 2007.

In 2008, the AASHTO Subcommittee on Right of Way and Utilities conducted another survey of its members, asking whether DOTs "allow utilities to occupy interstate rights of way for longitudinal use" (*34*). The purpose of the survey was to determine whether DOTs allow such use, whether they require compensation for such use, and whether they have special requirements or conditions for such use. Twenty-three DOTs responded to the survey; 15 reported that they do not allow utilities to occupy interstate rights-of-way longitudinally. The remaining seven states that responded affirmatively included two (Arizona and Pennsylvania) that had not allowed utility installations on controlled access right-of-way in the previous survey but had changed their policies. Thus, by 2008, a total of 36 states allowed such accommodation.

In 2009, the AASHTO Subcommittee on Right of Way and Utilities conducted another survey of its members, asking whether DOTs "have fiber-optic cable in the Interstate or State Highway right-of-way" (*35*). The purpose of this survey was to explore better ways to manage the use of existing excess fiber-optic cable capacity and expansion of DOT cable network through public-private partnerships. Thirteen DOTs responded to the survey; six reported that they do not have such fiber-optic installations. Of the seven states that responded affirmatively, additional comments from two states indicated that they allow fiber-optic cable on controlled access right-of-way, although for state ITS use only. One of these states (Ohio) had previously not allowed communication lines on controlled access right-of-way; thus, by 2009, 37 states allowed such accommodation.

Clear Zone Requirements

As frequently stated in state accommodation policies, a DOT's main concern with utility installations on the right-of-way is to preserve the safety and free flow of traffic, the structural integrity of highway features, ease of highway maintenance, highway aesthetics, and the integrity of utility facilities. An integral part of providing adequate space for an errant vehicle to recover without hitting an obstacle is the establishment of "clear zones," which are defined in AASHTO's *Roadside Design Guide* (*7*). The design guide specifies both minimum and desirable widths for the clear zone, which depend on several factors, including design speed, average daily traffic (ADT), horizontal and vertical curvatures, and slope of the backslope or foreslope.

DOT acquisition of right-of-way for highway construction considers clear zone and highway expansion requirements over the life of the project. At the very least, the right-of-way must be wide enough to accommodate the travel lanes and the minimum required clear zone. DOTs generally strive to purchase sufficient right-of-way to accommodate a desirable rather than minimum clear zone.

Changes in ADT, posted speed limit, functional classification, and the physical characteristics of the highway are common, so state utility accommodation rules and policies mandate that all longitudinal utility facilities, both above- and underground, must be installed on uniform alignments close to the right-of-way line to ensure space for future highway construction and possible future utility installations. Locating utility lines as close as possible to the right-of-way line minimizes the risk that a DOT or the utility may have to relocate a utility line when changes occur to the highway. Aboveground appurtenances must be located near the right-of-way line, should not interfere with highway maintenance or operations, and should not reduce visibility or sight distance. Additional requirements might include maximum allowable dimensions and compatibility with adjacent land use; for example, utility poles must be located within 3 ft of the right-of-way line and must have a base smaller than 36 inches in diameter. Guy wires must be installed in line

with the pole line and may not be placed in the clear zone (or must be of breakaway construction), and their use must be minimized.

Electric and Gas Transmission Lines

Since FHWA changed its regulation concerning the AASHTO utility accommodation policy in 1988, the subject of electric and gas transmission lines within controlled access right-of-way has been increasingly debated by DOTs, utility owners, and other stakeholders. For example, stakeholders have debated whether transmission lines should be allowable within medians. Although federal regulations (specifically in 23 CFR 645.209) do not prohibit the use of interstate medians for utility installations, they specify that utilities should be located at the outer edge of the right-of-way (*22*). Thus, FHWA discouraged the use of medians for utility installations in its 2003 *Program Guide* but stated that installations might be acceptable under exceptional circumstances (*8*). For example, very wide medians where utility installations would be outside the required clear zone could be suitable locations. AASHTO, on the other hand, took the position that median installations are not acceptable, as described in the 2005 AASHTO utility accommodation policy (*3*).

In 2004, the AASHTO Subcommittee on Right of Way and Utilities conducted a survey of its members, asking whether DOTs "allow the installation of transmission type utilities (i.e., electric) above ground in the median of a limited access highway" (*36*). Twenty-four DOTs responded to the survey; 23 said they do not allow longitudinal transmission line installations in the median. Only the District of Columbia said it has the authority to do so, but no examples of such installations exist. Six of the 23 states that do not allow longitudinal transmission lines in the median mentioned that they do allow crossings, which may require a single pole to be placed in a median in areas with very wide right-of-way. In these cases the median must be wide enough so that the pole can conform to clear zone requirements.

A survey in 2007 by the same AASHTO subcommittee expanded the 2004 survey to include gas transmission lines and included any part of the right-of-way, not just medians. The survey used the term "lease" instead of "allow access to," indicating that any allowable occupation of controlled access right-of-way would be compensable to the state. Specifically, the survey inquired whether "there are any states that lease controlled access right-of-way for longitudinal utility installations of gas and electrical transmission lines" (*37*). Twenty-three DOTs replied; only Michigan reported that it allows such installations.

Joint Trenching

Joint or common trenching is the installation of multiple utility lines in sequence with only one trench (Figure 1). Joint trenching can involve a wide range of utilities and configurations. It can result in shorter installation times, cost savings for installation and maintenance, more efficient use of right-of-way, and streamlined inspection (*38*).

According to a study by the U.S. Department of Housing and Urban Development, joint trenching can result in savings of about $3 to $5 per linear foot of trench, or about 20% to 30% in trenching costs (*39*). Joint trenching requires detailed coordination throughout planning and installation among all involved utilities. The utilities must also agree on aspects such as the design parameters for the trench, sharing costs of the installation, choosing a utility to lead the project, and choosing a qualified contractor. Because of the extensive coordination requirements during planning and construction, DOTs and utility owners do not often use joint trenching; however, the practice is gaining acceptance. Utilities participating in the Houston consolidated joint trench program have found that it is cost-effective and has simplified construction schedule management, because trenching occurs only once (*11*).

Utility Corridors

Definitions for the term "utility corridor" vary from state to state. Many refer to a designated area of state right-of-way rather than focusing on continuously accessible structures such as tunnels or decommissioned pipelines that can house multiple utility facilities. For example, in a survey to assess the use of utility corridors by DOTs, Kuhn et al. defined a utility corridor as follows: "A utility corridor is an area of highway right-of-way designated or used for the joint location of utilities, either public or private" (*38*). At the federal level, the Federal Land Policy Management Act defines utility corridors as "a parcel of land without fixed limits or boundaries that holders use as the location for one or more transportation or utility rights-of-way" (*41*). As mentioned previously, federal regulations for the accommodation of utilities under 23 CFR 645.209 define a utility strip, not a utility corridor. For the purpose of this study, the project panel and synthesis team agreed to use the term "utility corridor" and the following definition: "A utility corridor is a specified zone within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice."

Utility corridors may be established on both controlled access and regular state right-of-way. In many states, a utility corridor is a mechanism to allow utilities on controlled access right-of-way as part of an exception. For example, the utility accommodation rules in Texas allow the establishment of a utility strip on controlled access right-of-way if a utility requests access and the Texas Department of Transportation (TxDOT) grants the exception. The rules in Texas define a utility strip as "the area of land established within a control of access highway, located longitudinally within

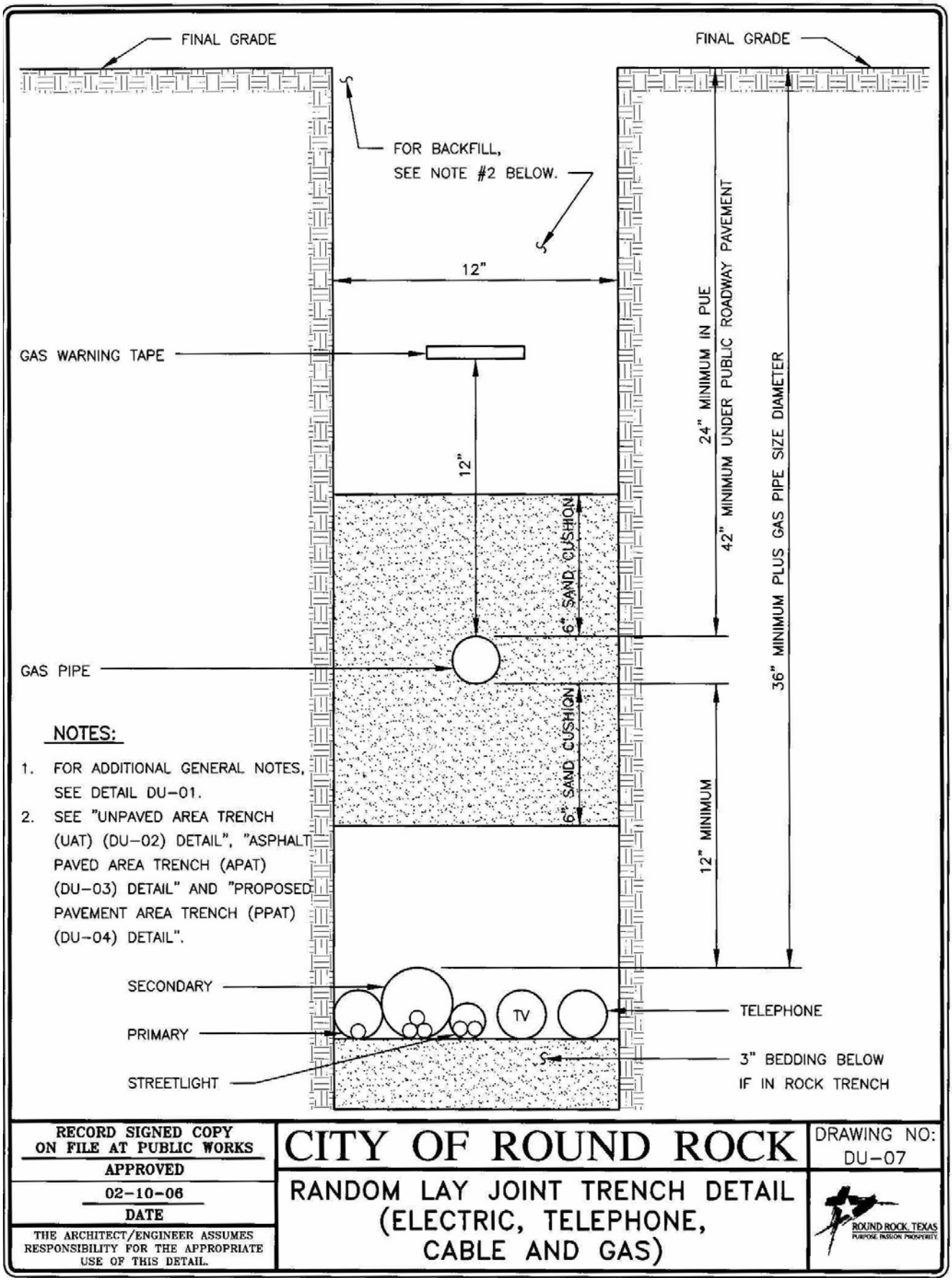

FIGURE 1 Value capture mechanisms in the context of transportation funding and public/private beneficiaries (*40*).

the area between the outer traveled way and the right-of-way line, for the nonexclusive use, occupancy, and access by one or more authorized public utilities" (*42*). For traffic safety reasons, TxDOT does not allow access to utility strips directly from the main lanes of the controlled access facility, regardless of the presence or absence of frontage roads. Further, utility strips do not convey an easement or property interest and may not be occupied by other utilities without an exception specifically approved for each utility.

In 2009, FHWA published a memorandum to provide guidance intended to complement its 2003 *Program Guide* (*43*). The memorandum discusses FHWA's interests regarding longitudinal accommodation of utility installations on the interstate system and the communication industry's impact on the use of the interstate right-of-way. The guidance acknowledges that the rapid development of utility services and technologies, especially for renewable energy, has led some states to pursue new ways to accommodate longitudinal utility installations. The guidance says that new utility services and technologies might not be explicitly addressed in the state's accommodation policies and encourages DOTs to review and evaluate their current utility accommodation policies and make modifications and updates as necessary.

The 2009 international scan reported that, in Canada, utility corridors have been considered a way to integrate utilities into multimodal transportation infrastructure planning (*44*). The corridors are used as long-term planning tools for the accommodation of utility facilities on future highways, protecting ring roads and utility alignments from advancing urban development. For example, in Alberta, the Government Organization Act included a provision for the establishment of Restricted Development Areas (RDAs), in which development and use are coordinated and regulated. Two RDAs (Calgary and Edmonton) have included the designation of utility corridors. Specific advantages to the use of utility corridors cited in the report include land conservation, limited environmental disruption, administrative efficiency, safety, land use certainty, assured alignments for future users, and open space. In Vancouver, engineers at the Greater Vancouver Regional District have taken the concept of utility corridors one step further, combining them with the construction of greenway paths and trails (*45*). The combined corridor (called "integrated utility greenway") provides public recreation and habitat protection concurrently with utility functions and is more cost-effective than traditional separate project development.

Cooperative Right-of-Way Acquisition

In general, DOTs define a highway project's need for right-of-way in relation to the needs of the highway facility, such as clear zone requirements. Right-of-way that is required for highway purposes can be condemned and converted to public use under the state powers of eminent domain, following the rules of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act), implemented by federal regulation (*46*). If a state or a political subdivision choses to acquire replacement right-of-way for utilities, the requirements of the Uniform Act apply. Utilities are usually not interpreted as a highway purpose; therefore, most state laws do not allow DOTs to purchase right-of-way for utility owner use.

At the federal level, FHWA provides that right-of-way must be exclusively devoted to public highway purposes and that utility accommodation in the right-of-way is in the public interest. As a result, right-of-way for utility use is eligible for federal reimbursement if a state routinely dedicates a portion of right-of-way for such use, while acquisition of right-of-way exclusively for utility accommodation is not eligible for reimbursement (*24*, *47*). In certain cases, federal participation in the cost to acquire replacement right-of-way might be approved if the acquisition is made in the interest of project economy or is necessary to meet the requirements of the highway project (*48*).

Operators of public utilities have similar powers of eminent domain, although they are not as comprehensive as those of the state. Usually, laws allow public utilities to use these powers to acquire an easement across private property. However, obtaining easements can be a lengthy and resource-intensive process, can cause project delays, and can have significant effects on utility ratepayers (*49*). The acquisition of right-of-way for utilities at the same time right-of-way is acquired for highway purposes can have great benefits for DOTs, utility owners, and affected property owners, as described in a recent NCHRP synthesis study (*50*).

Recently, some DOTs have started to find ways to assist utility owners with right-of-way and easement acquisitions. For example, research conducted in 2009 found that several states—including Alabama, California, Colorado, Delaware, Michigan, North Carolina, and Oregon—can purchase easements for utility use (*47*). Specific circumstances vary, but utility owners are usually required to have compensable property rights. A 2010 NCHRP study noted that the Virginia Department of Transportation (VDOT) has a policy that allows the department to negotiate the acquisition of utility easements with property owners on behalf of utility owners, as long as the utility owner has a compensable right (*51*). VDOT conducts and bears the cost of the negotiation, which gives it more control over the timing of the acquisition, but the utility owner still has to pay for the easement.

In 2010, AASHTO asked its members whether states acquire right-of-way or easements for utility owners (*52*). Only 11 states responded; four (Nevada, Ohio, Pennsylvania, and Washington) said they purchase right-of-way or easements for utility owners. (Virginia did not respond.) The Nevada DOT (NDOT) and the Ohio DOT (ODOT) indicated that the driving factor for the DOT to act on behalf of the utility owner is the project timeline. ODOT further indicated that it helps with

the acquisition only if the utility owner can demonstrate that its own efforts to acquire the easements were unsuccessful.

Uses of Right-of-Way for Renewable Energy Initiatives

Several state DOTs have begun to look for alternative uses of state right-of-way, including renewable energy projects. The implementation of renewable energy technologies on highway right-of-way is compatible with current U.S.DOT priorities; specifically, the goal of finding sustainable ways to address the nation's transportation needs. Various considerations are the driving factors behind these activities, including state efforts to reduce carbon emissions, making use of renewable energy available to the state, the support of state industries focusing on renewable energy, and an interest in extracting additional value from existing real property assets for infrastructure projects.

As mentioned earlier, federal regulations allow certain nonhighway uses of the right-of-way if those uses are in the public interest and will not interfere with highway operations or impair the safety of the roadway (*23*). Each state is given the flexibility to adopt its own utility accommodation plan and prepare a right-of-way manual on how to accommodate renewable energy technologies and alternative fuel facilities in the highway right-of-way.

A feasibility study conducted for NCHRP in 2011 surveyed state DOTs to determine whether states use renewable energy installations—specifically solar or wind units—for transportation infrastructure (*53*). Installations of interest included lighting and signage at intersections and interchanges, illuminated right-of-way, and variable message signs. Of the 23 states that responded, all used solar and/or wind installations: 22 states used solar and five states used wind.

A survey conducted by the Volpe Center in 2012 found that, of 39 states responding, 36 did not have any laws or other requirements that correspond to the generation of renewable energy within the right-of-way (*54*). In addition, 29 states indicated that their utility accommodation policy does not characterize renewable energy facilities; for example, the term "utility" might refer to the means necessary to distribute power but not to generation. Other states simply do not make a distinction between renewable and nonrenewable energy facilities. Table 1 provides an overview of the renewable energy initiatives at state DOTs mentioned in this report.

Use of Technology for Utility Permitting

Permits for utility installations on controlled access and noncontrolled access right-of-way are typically paper-based, although some states have implemented or are in the process of implementing electronic permitting systems. An ongoing NCHRP synthesis project is focusing on the state-of-the-practice for online systems for utility permits at state DOTs (*55*). The project received responses from 47 states; six of them—Georgia, Michigan, Missouri, Pennsylvania, Texas, and Utah—have formal systems that can accept permit applications from utility owners in electronic format. Eight additional states have partially electronic permitting systems in place, seven states reported that electronic permitting systems are under development, and four states said they are considering the development of such a system.

TABLE 1
EXAMPLES OF RIGHT-OF-WAY USE FOR RENEWABLE ENERGY PROJECTS

Alternative Use	Initiative
Renewable Energy in the Right-of-Way Feasibility Research	Colorado DOT, Ohio DOT, Texas DOT, Massachusetts DOT
Solar Energy Projects	Oregon DOT's Solar Highway Projects
	California's Proposed Highway 50 Solar Energy Projects Massachusetts' Proposed Route 44 Solar Energy Project
	Ohio DOT's Veterans' Glass City Skyway Bridge Solar Array Project
Wind Energy Projects	Massachusetts DOT's Proposed Wind Energy Project along the Massachusetts Turnpike
	Ohio DOT's Wind Turbine Project
Bioenergy Projects	Utah DOT's and Utah State University's Freeways to Fuel Pilot Project
	North Carolina DOT's Bioenergy Pilot Project
Electric Vehicle Charging Stations	Florida Turnpike Enterprise

Source: Alternative Uses of Highway Right-of-Way—Accommodating Renewable Energy Technologies and Alternative Fuel Facilities (*54*).

The Georgia DOT (GDOT) uses the Georgia Utility Permitting System (GUPS), which was designed in-house by the GDOT Utilities Office and the GDOT Information Technology Section (*56*). GUPS is a web-based system that allows utility owners to submit permit application packages to GDOT for review and approval. The Michigan DOT has a construction permit system that utility owners can use to request and receive permits to work within the highway right-of-way (*57*). The Missouri DOT has developed a permit database that utility owners can access to request and receive permits (*58*). The Pennsylvania DOT (PennDOT) has an online ePermitting System (EPS) that utility owners can use to apply for highway occupancy permits (*59*). EPS allows PennDOT to review permit applications and issue permits online. TxDOT has an electronic system called Utility Installation Review (UIR), which was developed by the Texas A&M Transportation Institute (*60*). UIR is a web-based system that allows utility owners to submit permit application packages online and enables TxDOT to review the applications, track the event history, approve and issue the utility permit, and then include the permit in a GIS inventory database. The Utah DOT (UDOT) has an Online Permit System (OPS) that serves as a one-stop permit application portal (*61*). OPS was developed in-house to support UDOT's utility-related permitting processes.

CHAPTER THREE

STAKEHOLDER RECOMMENDATIONS, EXEMPLARY PRACTICES, AND IMPLEMENTATION EXPERIENCES

ONLINE SURVEY

The study team conducted an online survey of U.S. state DOTs to assess general practices and ideas related to management of longitudinal utilities on controlled access right-of-way. The team used an online system and invited all voting members of the AASHTO Subcommittee on Right of Way, Utilities, and Outdoor Advertising Control to participate.

The survey questionnaire (Appendix A) consisted of 11 main questions, several of which included additional related questions. Depending on the responses to the main questions, survey participants answered up to 23 questions. Appendix B provides a detailed overview of responses to each question, while Appendix C quotes some of the actual responses given by participants.

The TRB study coordinator emailed 85 people on February 20, 2013, with an invitation to participate in the survey by March 6, 2013. Nine emails bounced back, for a net survey population of 76. Less than 80% of DOTs had responded by the original closing date, so the study team sent reminders and follow-up emails, and made phone calls. The team closed the survey on April 1, 2013, with 43 of 51 DOTs responding, a response rate of 84%.

MANAGEMENT PROCEDURES AT STATE DEPARTMENTS OF TRANSPORTATION

Beginning in 1988, federal regulations allowed states to establish their own utility accommodation policies; since then, more and more states have allowed the longitudinal accommodation of utilities on controlled access right-of-way. Figure 2 shows the states that have allowed such accommodation over time, based on surveys by AASHTO and NCHRP. Responses to the survey conducted for this project are shown in the "2013" column. The researchers note that the set of states that responded to the 2009 survey differs from the set that responded to the 2013 survey. Of the 37 states that responded affirmatively to the 2009 survey, five did not respond to the 2013 survey. These five states were added to the 40 states that responded affirmatively to the 2013 survey, for a total of 45 of 51 DOTs (88%) that currently manage longitudinal utility installations on controlled access right-of-way.

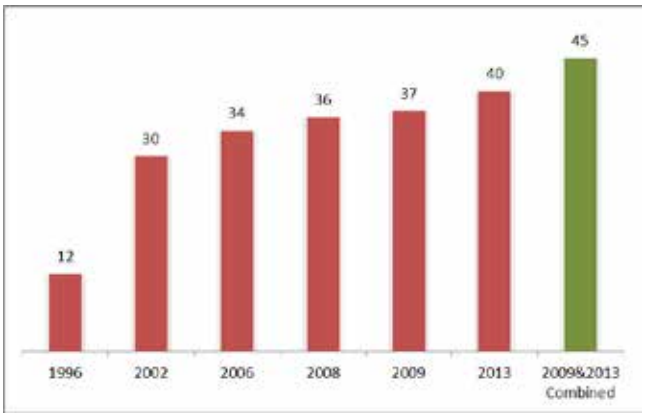

FIGURE 2 Number of states managing longitudinal utility installations on controlled access right-of-way by year of survey [*Sources* for 1996 (*26*), 2002 (*30*), 2006 (*32*), 2008 (*34*), 2009 (*35*)].

The study team asked what documents contain procedures and processes for the management of longitudinal utility installations on controlled access right-of-way. Table C1 in Appendix C provides an overview of the document types, names, and web addresses provided by survey respondents. In most cases, the state accommodation rule or policy is the source of these management procedures, but only 10 DOTs said it is their only source. Twenty-three DOTs use the rules in combination with one or more additional documents, such as a state utility manual, a state permit manual, the FHWA *Utility Guide*, the current AASHTO accommodation policy, or specialized state guidelines. Six DOTs rely on sources other than the state accommodation policy.

Unpublished Procedures

Of the 43 DOTs responding, seven said they use procedures that are not published in policies or statutes to manage utility installations on controlled access right-of-way. A common element among these responses was that processes can be influenced by local circumstances. For example, larger or more populous districts may have more staff and more requests for certain types of utility installations, which may result in different processes to manage them. Additionally, some information about the coordination process might not be included in manuals or statutes but might simply be provided on the utility permit document; for example, some permits state that the utility owner must coordi-

nate the details of the installation with the DOT district permit coordinator.

Some states mentioned that they encourage utility owners to use shared trenches and conduit during construction. Respondents said that although shared trenching is a great idea in theory, this type of coordination is very difficult and is rarely successful in the field. Similarly, some states ask utility owners to place a line within a certain distance of the right-of-way line (e.g., 15 ft); this might not be required by law, but it is an accepted engineering practice. If the utility owner is unable or unwilling to comply with the request, exceptions can be negotiated with the DOT.

The Wisconsin DOT noted that for planned electric transmission projects, it works directly with the Public Service Commission (PSC), the state regulatory agency that oversees the electric transmission industry. Coordination with the PSC begins before the public information process and continues through many stages of project development, including draft environmental impact statement (EIS), final EIS, public hearings, and final decision (order). Depending on the project, coordination with the PSC might continue during the design, permitting, and construction processes. This coordination ensures that the DOT's perspective and requirements are shared with the utility owner, and that all parties are aware that the DOT may or may not be able to accommodate the project on state controlled access highway right-of-way.

It was noted that some states have approved only a few longitudinal installations so far; therefore, procedures for approval vary considerably.

Urban Versus Rural Management Procedures

Of the seven state DOTs whose procedures are not published in state policies or statutes, four reported that they do not manage urban and rural utilities differently, two reported that they do manage them differently, and one did not provide an answer. The two DOTs that manage utilities differently (Virginia and Wisconsin) gave some examples of different procedures. Work times in urban areas can be more restrictive than those in rural areas; in fact, the DOT might require that work in urban areas be performed overnight owing to traffic concerns. DOTs might also be more diligent when dealing with utilities in urban areas, since these areas have less space for utility installations and present a greater risk for a utility to conflict with obstacles such as retaining walls, sound barriers, and bridge abutments. Utilities in urban areas are also more likely than those in rural areas to need access from the highway shoulder.

The Wisconsin DOT has a per mile longitudinal fee for utility installations on controlled access right-of-way that includes a factor based on the annual average daily traffic count. As a result, the installation fee is higher in urban areas.

Utility Owner Input

The development of the procedures and processes is typically a DOT internal activity that occurs with some input from utility owners. Six states said they do not allow any input from utilities, but this appears to refer to the development of internal procedures or manuals, not the state rulemaking process. All of the DOTs that allow some type of input mentioned the state rulemaking process as one option for utility owner input. DOTs also mentioned the following activities to encourage utility input into the development of management procedures:

- Reaching out to utility owners to provide feedback on existing rules.
- Participating in joint committees or councils between DOTs and utility owners that meet on a regular basis to discuss policies and procedures.
- Actively soliciting feedback and comments from utility owners when state manuals and guidelines are being updated.
- Providing opportunities for informal feedback from utility owners; for example, at utility owner focus groups or training sessions.

Utility Owner Involvement in Location of Utility Facilities

States were asked whether utility owners can specify the location of their facilities in the right-of-way during utility permitting. Of the 43 DOTs that responded, 38 said that the state has a process that allows this, and four said they do not have such a process. It was noted that when the DOTs described their processes, most did not differentiate between the process for requesting a location in a noncontrolled versus a controlled access right-of-way.

Typically, utility owners submit a permit application with general information about their preferred location for the utility facility. The DOT reviews the request, determines whether the accommodation is feasible, and then asks for specific details about the location in the form of design drawings. The DOT and utility owner representatives might have field or office meetings to discuss concerns, potential design revisions, and redesign needs. These typically occur at the local level and involve district utility coordinators. Some DOTs require utility owners to mark existing lines in the field to determine potential conflicts. DOTs sometimes have a target zone (e.g., 5 ft from the right-of-way line) in which they try to place utility installations. The DOT reviews the detailed information to ensure compliance with accommodation rules and either makes a decision or requests more information.

Utility permits are typically reviewed at the local or regional level, but a central office is often involved if the utility installation is unusual or requires some type of compensation. Thus, central offices are often involved with requests

for utility installations on controlled access right-of-way. Some DOTs route permit requests through various divisions for comment; this process is time-consuming, and it can take several months for all divisions to review the request. Other DOTs have a review committee (e.g., a shared resource committee or board of public works) that reviews corridor locations that utility owners have requested. If they approve a request, the committee asks for detailed plans that are reviewed jointly by the committee, which might include the district engineer and a utility section representative. Following the review, the committee issues a recommendation to the central office on whether to issue a permit or not. When a permit is approved by the state DOT, it may be returned to the utility owner for notification or forwarded to FHWA, depending on whether or not the DOT has approval authority.

In some states, occupancy of utility facilities on controlled access occurs via a resource sharing agreement. One or more utility owners will submit preliminary plans for a utility corridor located as close to the right-of-way line as possible. The DOT then conducts a site review and requests final plans. Once the utility owners provide the final plans, the DOT reviews them and come to a decision regarding the utility corridor installation.

One state that allows electric transmission line installations on controlled access right-of-way reported that this type of utility installation usually requires several meetings with the utility, the DOT, and possibly other agencies, such as the public service commission, to determine a final corridor location. Once all parties agree on the location, the DOT works with the utility owner to finalize the design alignment.

In summary, it appears that most DOTs use a similar process to review longitudinal utility installations on controlled and noncontrolled access right-of-way, but the former involves more scrutiny and a more detailed review.

UTILITY CORRIDORS

The study team defined a utility corridor as a specified zone within the right-of-way in which multiple longitudinal utilities are required to be located by agency policy or practice. Of 39 DOTs responding, 15 said they use this type of utility corridor; the other 24 do not. Of the states that use utility corridors, six DOTs commented on the definition provided, and three offered a new definition. Georgia commented that the definition is correct but added that utility corridors are limited in the state to areas where roadways have frontage roads. The Indiana DOT uses utility corridors outside the area confined by a security fence but within the state right-of-way. Such utility corridors are authorized only in locations that will not affect traffic movement during utility maintenance operations. The Pennsylvania DOT creates a utility corridor by moving the limited access line inward from the right-of-way line. Utilities can then install facilities in the area between the limited access line and the right-of-way line. The Ohio DOT makes efforts on some projects to acquire additional right-of-way for exclusive utility use, depending on the availability of such right-of-way in the project corridor. In general, DOTs determine the width of a utility corridor on the basis of available right-of-way and minimum utility requirements.

South Dakota, Texas, and Utah provided their own definitions of a utility corridor. The South Dakota DOT defines a utility corridor as "an easement other than right-of-way for multiple utilities to occupy." Utah uses the designation "generalized corridor," which should be located in an area as close to the right-of-way line as possible, not underneath pavement, not in medians, with access points located outside of no-access lines. Depending on project constraints, the Utah DOT may require joint occupancy in trenches or poles. Texas uses the term "utility strip," which is defined as "the area of land established within a control of access highway, located longitudinally within the area between the outer traveled way and the right-of-way line, for the nonexclusive use, occupancy, and access by one or more authorized public utilities." Texas uses utility strips only if requested by a utility owner as an exception to the general accommodation rules. Thirteen states reported that they use utility corridors for longitudinal installations; six of these also use utility corridors for crossings. Idaho uses utility corridors only for transverse crossings. Table 2 provides a list of the states and their uses of utility corridors.

TABLE 2
USE OF UTILITY CORRIDORS ON CONTROLLED ACCESS RIGHT-OF-WAY TO MANAGE LONGITUDINAL UTILITY INSTALLATIONS

Installation Type	State
Only Longitudinal Installations	Arkansas, California, Georgia, Iowa, South Dakota, Texas, Virginia.
Longitudinal Installations and Transverse Crossings	North Dakota, New Jersey, Ohio, Utah, Vermont, Washington State.
Only Transverse Crossings	Idaho.

The researchers noted differences in the way longitudinal utility corridors are implemented by state DOTs. Several DOTs mentioned that they establish utility corridors by moving the access control line from the right-of-way line inward to provide an area for utility installations between the two lines. States that move the access control line may also move security fences, so that utility installations are outside the security fence but within the state right-of-way.

Other states leave the access control line in place and add a utility access control (or denial) line between the right-of-way line and the proposed installation. In this method, the

access remains unaltered and security fences do not need to be moved. Leaving the utilities clearly inside the controlled access right of-way and within the security fence might also make it easier to ensure that the utility does not provide service connections from within the controlled access right-of-way.

Specific Scenarios for Use of Utility Corridors

Several states reported that utility corridors are established through a variance or exception process that involves significant review by DOT staff and may involve special engineering groups, councils, or review committees. Some DOTs (e.g., Iowa, Utah, and Washington) said that the state might have additional requirements for the installation in utility corridors, such as the use of shared trenching or multiduct conduit.

Indiana mentioned that utility corridors are useful on added capacity projects. These projects can be significantly delayed if utility owners take too much time to purchase new utility easements. Providing a space for them to relocate can substantially accelerate utility relocations; however, the DOT must play an active role in the coordination process to help utility owners agree on the size and location of facilities within the utility corridor.

Utility Corridor Use as Easement

Only two states commented on the purchase of additional right-of-way for use by utilities. The Ohio DOT said that it will purchase additional right-of-way if it is available. South Dakota, which defines utility corridors as "an easement other than right-of-way for multiple utilities to occupy," will purchase easements in situations where such a purchase will clearly benefit a project by accelerating utility relocations. Common scenarios are projects that have multiple utility owners with adjustment costs that are eligible for reimbursement, projects that have utility adjustments in a location where utility owners have experienced difficulties with the acquisition of easements from private landowners, and projects with little space for utility installations on the proposed right-of-way. If utility owners are eligible for reimbursement of their relocation costs, the DOT will not request reimbursement for the purchase of additional right-of-way.

ACCOMMODATION OF RENEWABLE ENERGY SOURCES

Of 36 states responding, only Minnesota and Wyoming stated that they have a policy to accommodate infrastructure that supports renewable energy sources. Minnesota is in the process of updating its accommodation policy to include renewable energy sources; Wyoming already allows such installations, although a review of the state's utility accommodation rules found no specific reference to renewable energy sources (*3*). Renewable energy installations may be permissible under a rule that allows encroachment on controlled access right-of-way if it passes an evaluation by the Wyoming DOT and complies with certain minimum criteria. Thus, Wyoming may allow renewable energy installations in the controlled access right-of-way without expressly stating this in its utility accommodation policy.

KEY MANAGEMENT ISSUES

Issues During Regular Permitting

Twenty-five DOTs provided examples of the problems DOTs encounter in managing longitudinal utility installations on controlled access right-of-way during regular permitting, outside of project development. Eight DOTs did not provide any examples, and 18 did not respond or responded to the question in a manner that did not apply. The DOTs that did not provide an example noted that they had approved very few or no longitudinal utility installations on controlled access right-of-way.

Among the DOTs that provided an example, the key issues were the safety of the traveling public and potential effects on the road level of service during installation, as well as maintenance activities and maintenance access. Several DOTs reported noncompliance issues throughout the process of longitudinally accommodating utilities on controlled access right-of-way. For example, information provided by utility owners in the permit application might not be sufficient to accurately locate the proposed facility, with the result that the actual location would differ from the permitted location. The installation location might be outside the designated limits of a utility corridor, or facilities might not be installed at the required depth. Several DOTs reported that some utility owners do not perform sufficient erosion control or restore the right-of-way adequately after the installation is complete. DOTs were also concerned that utility owners might supply inadequate traffic control during construction or maintenance activities, which could result in limiting utility work to nighttime hours.

DOTs mentioned difficulties with the establishment of a fair value for the longitudinal occupation and use of controlled access right-of-way. These difficulties can be compounded when dealing with special valuation situations such as shared resource agreements and the release of scenic easement rights, because little guidance is available on how to appraise these rights for all affected parties. DOTs also mentioned the following issues:

- Finding resources to adequately educate district staff about the complex requirements for longitudinal utility installations on controlled access right-of-way.
- Political pressure to allow longitudinal installations on the right-of-way of controlled access corridors. Political pressure often originates from utility owners or local

governments that want to allow utility owners on controlled access right-of-way for economic reasons.
- Encroachment of electric transmission lines into right-of-way air space. Some DOTs allow overhanging facilities to encroach on the right-of-way as an exception if a modification of the line would have significant effects on agricultural activities outside the right-of-way.
- Mitigating poles located within the clear zone that have a history of collisions. Poles that are allowed under an exception and then become a problem are very difficult to mitigate.
- Permitting utility installations that require the removal of trees and other vegetation that the DOT uses for snow control. Weighing the interests of the utility owner against the purpose of the vegetation to safeguard traffic operations during snow conditions can be challenging. Some utilities have worked with DOTs to come up with vegetation replacement plans that use low-growth vegetation for snow control while at the same time allowing the utilities to maintain their electric safety code clearances.
- A lack of adequate as-built drawings once utility owners complete the installation of their facilities, or a general lack of as-built drawings.
- Removal of the DOT's right-of-way markers by utility owners during construction.
- Responding to and dealing with utility companies that believe the permit approval process takes too long.

Issues During DOT Project Development

Twenty-six DOTs provided examples of the problems they encounter in managing longitudinal utility installations on controlled access right-of-way during DOT project development. Five DOTs did not provide any examples, and 20 did not respond or responded to the question in a manner that did not apply. Again, the DOTs that did not provide an example noted that they had approved few or no longitudinal utility installations on controlled access right-of-way.

Among the DOTs that provided an example, the key issue was the need for coordination with utility owners during the project development process. Specific utility problems during project development included the following:

- The resources required by the DOT to develop utility agreements.
- Defining and then meeting scheduled utility adjustment completion dates.
- Receiving timely responses from utility owners during the coordination process.
- Identifying and resolving utility conflicts.

DOTs frequently mentioned issues related to meeting deadlines for the highway project and a lack of accurate information about the location of utility facilities. Issues mentioned less frequently were the cost of relocation, lack of utility as-builts, dealing with the terms of utility agreements, and maintenance access. DOTs also mentioned the following issues:

- Finding feasible alternatives and solutions to problems in utility conflicts.
- Ensuring that utility owners comply with the state's utility accommodation rules.
- Political pressure to allow longitudinal installations on the right-of-way of controlled access corridors. Political pressure often originates from utility owners or local governments that want to allow utility owners on controlled access right-of-way for economic reasons.
- The potential for conflict between new installations and future roadway improvements.
- Coordination of utility installation with the highway contractor, as longitudinal utility installations on controlled access right-of-way often occur during highway construction.

One DOT stated that a recurring issue is the need to retrieve fragmented data from multiple data systems—significant efforts result in only snapshots of a particular area of interest. An overview of the entire state network in a dynamic, visual, and possibly real-time environment remains unattainable. An advanced GIS to visualize the entire state network would have a significant impact on the development of solutions to strategic transportation challenges. However, potential future cost savings can be difficult to quantify, which makes it hard for the state DOT to justify and acquire the necessary funding for GIS.

Summary of Key Issues

In summary, many of the issues DOTs have with longitudinal utility installations on controlled access right-of-way are similar to issues on uncontrolled right-of-way. In fact, the Florida DOT responded that it does not allow utilities on controlled access right-of-way, but if the state grants an exception, the utility is treated like any other permitted facility on the right-of-way. Exceptions to this approach would be the valuation and appraisal of the longitudinal occupation of controlled access right-of-way, especially for less common cases such as scenic easements, and the increasing political pressure on DOTs to allow the longitudinal occupation of controlled access right-of-way to utilities other than communication lines.

EXEMPLARY PRACTICES FOR LONGITUDINAL UTILITY INSTALLATIONS ON CONTROLLED ACCESS RIGHT-OF-WAY

Several DOTs shared practices for the longitudinal accommodation of utilities on controlled access right-of-way that have worked well in their state. Many states consider the use of utility corridors to be an exemplary practice. DOTs

also provided general recommendations for dealing with longitudinal utility installations on controlled access right-of-way. For example, when reviewing applications for installations, it is a good practice to reach out to subject matter experts in the DOT to get a broad perspective on a particular project. It also a good practice to start coordination with utility owners early in the design process, when project design is about 30% complete. If the need for utility accommodation or utility corridors is identified early, it is much easier for designers to incorporate changes. Other exemplary practices mentioned by survey respondents are summarized in the following paragraphs.

Centralized Review Committees

Several DOTs said that utilities are allowed longitudinally on controlled access right-of-way in their state, but only on an exceptional basis; thus, the review of an application for an exception must be systematically structured to ensure that utility owners receive fair reviews of their requests. To aid in this process, some states have established centralized committees to review requests for installations on controlled access right-of-way. In Arizona, the Shared Resource Committee is the central management entity for controlled access right-of-way. Similarly, California has an Engineering Assessment Group at DOT headquarters that reviews requests for exceptions to policy. An advantage of establishing such committees is that the review process becomes more transparent: the utility owner knows who is reviewing the request and whom to contact with questions. Having one committee that is responsible for reviewing these applications also ensures that certain DOT staff members will be familiar with accommodation issues and decisions will be developed fairly and consistently across the state.

Shared Resource Agreements

Several DOTs mentioned that shared resource agreements have worked well in their states. Utah allows communication utilities on controlled access right-of-way if the utility provides a service to the DOT. Installations may involve conduits that allow future expansion for other communication utilities. Wisconsin has some corridors with communication utilities on controlled access right-of-way; this arrangement provides the DOT with access to dark (unused) fiber, which the department has accepted in lieu of a cash payment. The Wisconsin DOT has been able to use the fiber to connect ITS facilities such as changeable message boards, ramp meters, and traffic cameras. The Iowa DOT shares some fiber-optic lines with a communications company owned by the state.

Electric Transmission Lines on Controlled Access Right-of-Way

According to a 2007 AASHTO survey and this synthesis survey, both the Michigan DOT and the Wisconsin DOT allow the longitudinal accommodation of electric transmission lines on controlled access right-of-way (*37*). The Wisconsin DOT allows this type of accommodation on the basis of a state law that requires consideration of controlled access highways in electric transmission route planning. Locating the transmission line next to the security fence on the DOT right-of-way eliminates the need to clear a separate corridor for the line, which minimizes environmental impacts. Wisconsin charges longitudinal fees to the electric transmission utilities whether its poles are physically on the controlled access right-of-way or its lines occupy the airspace over it, because the utility must maintain electrical safety code clearances that restrict the state's use of that portion of the right-of-way.

Joint Trenching

Joint trenching (installing multiple utility lines in sequence with only one trench) can involve a wide range of utilities and configurations. Joint trenching can result in shorter installation times, cost savings for installation and maintenance, more efficient use of right-of-way, and streamlined inspection. However, it requires detailed coordination throughout planning and installation among all involved utilities. The utilities must also agree on aspects such as the design parameters for the trench, sharing costs of the installation, choosing a utility to lead the project, and choosing a qualified contractor. Because of the extensive coordination required during planning and construction, DOTs and utility owners often do not use joint trenching; however, the practice can be especially useful when combined with the development of a utility corridor.

Utility Corridors

Utility corridors (specified zones within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice) can provide a framework for the occupation of utilities on controlled access right-of-way. State accommodation policies differ significantly in their specific regulations for the establishment of a utility corridor. Some states require special engineering groups or councils to review the plans for a utility corridor, while others have additional requirements for installations in utility corridors, such as the use of shared trenching or multiduct conduit. State DOTs cited particular benefits for added capacity projects, which can be significantly delayed if utility owners take too much time to purchase new utility easements. The DOTs play an active role in the coordination process to help utility owners agree on the size and location of utility facilities in the utility corridor.

Electronic Permitting Systems

Traditionally, application submission has been by mail, but several DOTs have developed electronic permitting systems

that have significantly accelerated the process. Georgia, Michigan, Missouri, Pennsylvania, Texas, and Utah have developed such systems; several other states have systems under development or are considering them.

Cooperative Right-of-Way Acquisition

The literature review found that several states have the ability to help utility owners purchase right-of-way property rights, such as easements. Alabama, California, Colorado, Delaware, Michigan, North Carolina, and Oregon can purchase easements for utility owners under certain circumstances; the utility owner is usually required to have a compensable property right. DOTs have made positive comments about the benefits of the practice; better control and timely acquisition seem to outweigh the cost of the negotiation that is borne by the DOT. Only Ohio and South Dakota commented on this topic for this survey; both indicated that the practice can have significant benefits for a project when it is applied in the appropriate context.

OTHER FINDINGS

The researchers noted that state DOTs occasionally use different terminology for similar utility installations and accommodation concepts, which can be confusing. For example, survey respondents were asked to define the term "utility corridor" if their definition differed from the one provided. In the survey, the term referred to a physical structure, often underground, for the sole use of utilities, or as a defined zone within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice. One state defined a utility corridor as an easement other than right-of-way for multiple utilities to occupy, and the term is used in Canada to refer to an area that is used as a planning tool for future utility installations. Some states do not use the term at all but refer to a "generalized corridor" or (following the definition in the federal regulations) "utility strip."

The researchers noted a similar issue with the term "renewable energy." A review of state accommodation policies produced no definitions for the term in the context of longitudinal utility accommodation on controlled access right-of-way. Thus, it is not entirely clear what constitutes a renewable energy facility and what does not.

A third example is the use of the term "extreme hardship," which many utility accommodation policies include with reference to allowing exceptions to rules. Some state policies provide examples of conditions that could qualify as an extreme hardship, but most do not define the term. State DOTs offer no common definition, procedure, threshold, or parameters for an extreme hardship, and each state addresses the issue slightly differently. This lack of clarity might be an issue for nationwide utilities that would qualify for a hardship exception in one state but not another.

CHAPTER FOUR

CONCLUSIONS

State DOTs face several challenges in dealing with longitudinal utility installations on controlled access right-of-way. They need to know where utility installations are located or plan to locate, how much space is available in the public right-of-way, who owns the utility facilities, and who the customers are. DOTs are compelled to think strategically about the accommodation of longitudinal utilities on controlled access right-of-way. They must balance increasing demand for access to finite right-of-way with the need for safe and efficient travel and the necessity to minimize future utility relocations and associated project costs, while ensuring that access to right-of-way is equitable for all public utility owners.

Almost all state DOTs have policies and procedures that aim to strike a balance among these competing goals. The policies are driven by the realization that, if implemented cautiously and correctly, longitudinal utility installations on controlled access right-of-way can provide synergetic benefits for the utility owner, the DOT, and the public.

The results of this project and several recent surveys indicate that at least 45 of 51 state DOTs currently manage longitudinal utility installations on controlled access right-of-way. The survey found that procedures used to manage these installations are published in state utility manuals, state permitting manuals, and the state accommodation policy, although several states also use unpublished procedures.

The extent to which utilities have input into the development of these procedures varies considerably from state to state. Although utility owners have an opportunity to provide input in the state rulemaking process, some states are more proactive about reaching out to utility owners at other levels, such as joint committees or councils.

Utility corridors, or utility strips, are being used by several states for longitudinal utility installations on controlled access right-of-way. A few states also use utility corridors for transverse crossings. The implementation of utility corridors varies; for example, some states use them only on controlled access right-of-way with frontage roads, while others do not have that restriction. States also differ in the delineation of the zone, whether the denial of access line is moved inward from the right-of-way line, and whether a utility access control line is used. Definitions of a utility corridor are similar across states except for South Dakota, which defines it as an easement other than right-of-way.

Few states reported any development in the area of accommodation of renewable energy sources. It appears that in many states, renewable energy installations would be feasible under current state policies for variances or exceptions. Like any other utility, a renewable energy provider could request an exception for installation on controlled access right-of-way; whether the installation would be allowable would depend on the state's accommodation policy. Minnesota was the only state that reported that it is in the process of updating its accommodation policy. If interest from renewable energy providers increases, more states will probably review their accommodation policies.

Issues with the accommodation of longitudinal utility installations on controlled access right-of-way during regular permitting and during DOT project development are similar to the issues DOTs have with utility installations on noncontrolled access right-of-way. Safety of the traveling public and potential effects on the road level of service during installation and maintenance activities were frequently mentioned, as were issues with utility coordination during project development. Issues that appear unique to the longitudinal accommodation on controlled access right-of-way are the valuation and appraisal of occupying the right-of-way itself, especially in shared resource agreements or for less common cases, such as occupying scenic easements. Some DOTs noted increasing political pressure to allow the longitudinal occupation of controlled access right-of-way to utilities other than communication lines.

DOTs mentioned several exemplary practices to deal with the accommodation of longitudinal utility installations on controlled access right-of-way, including the use of centralized review committees, shared resource agreements, electric transmission lines on controlled access right-of-way, joint trenching, utility corridors, electronic permitting systems, and cooperative right-of-way acquisition (Table 3).

DOTs also offered general recommendations, such as starting utility coordination activities early in the design process to ensure sufficient time to evaluate and implement accommodation strategies.

TABLE 3
EXEMPLARY PRACTICES FOR LONGITUDINAL UTILITY INSTALLATIONS ON CONTROLLED ACCESS RIGHT-OF-WAY

Exemplary Practice	Comments
Centralized Review Committees	Active states are Arkansas and Maryland.
Shared Resource Agreements	45 states manage longitudinal utility installations on controlled access right-of-way, many using shared resource agreements.
Electric Transmission Lines on Controlled Access Right-of-Way	Michigan, Wisconsin
Joint Trenching	Available to all states but requires detailed coordination among stakeholders. Especially useful for utility corridors.
Utility Corridors	15 states use utility corridors and utility strips to manage longitudinal utility installations on controlled access right-of-way
Electronic Permitting Systems	States with implemented systems are Georgia, Michigan, Missouri, Pennsylvania, Texas, Utah.
Cooperative Right-of-Way Acquisition	Several active states, including Alabama, California, Colorado, Delaware, Michigan, North Carolina, Oregon, and Virginia.

Several areas of potential research were identified that were outside the scope of the project but should be part of future research initiatives, including the following:

- **Review current practices and provide guidance on the use of electric transmission lines on controlled access right-of-way.** The literature review and the responses from survey participants indicate that DOTs have little guidance for dealing with longitudinal utility installations of electric transmission lines on controlled access right-of-way. Related issues are the encroachment into state right-of-way air space of electric transmission lines located outside the right-of-way and compensation to the DOT for tree/vegetation removal or reestablishment of low-growth vegetation if needed for snow control.
- **Assess the use of renewable energy sources on controlled access right-of-way.** Currently, only a few states are active in this area, but state DOT officials' responses suggest that projects in this area will increase in the future. It would be useful to provide an assessment of DOT plans and developments for renewable energy sources on controlled access right-of-way.
- **Develop guidance for state DOTs interested in the development of policies for accommodating renewable energy projects in the highway right-of-way.** It was found that few state utility accommodation policies specifically address renewable energy facilities or distinguish between facilities for energy generation and energy distribution/transmission. For example, it is not clear how states define scenarios and circumstances in which transmission lines could be considered a renewable energy facility. Research could synthesize existing information and provide guidance for the accommodation of renewable energy in the highway right-of-way without affecting the safe operation of the highway facility.
- **Assessment and valuation of occupying controlled access right-of-way.** Several states mentioned difficulties in determining a value for the longitudinal occupation of controlled access right-of-way, especially in cases of shared resource agreements or unique situations such as utility attachments on major bridges. A related issue is the resolution and valuation of special property rights cases, including scenic easements.
- **Utility owner perspective.** The scope of this project did not include a review of other stakeholders, such as utility owners. It would be useful to review the perspective of different types of utility owners with respect to the accommodation of longitudinal utilities on controlled access right-of-way.
- **Guidelines for variances and exceptions.** Most if not all state utility accommodation policies include a passage on exceptions to the rules, which are usually based on "extreme hardship" for utility owners. Some state policies provide examples of conditions that could qualify as an extreme hardship, but most do not define the term. State DOTs offer no common definition, procedure, threshold, or parameters for an extreme hardship, and each state addresses the issue slightly differently. This lack of clarity might be an issue for nationwide utilities that would qualify for a hardship exception in one state but not another. It would be useful to compare state utility accommodation policies and manuals to identify the differences among guidelines for the determination of a variance or exception from established policy. Researchers could review exceptions granted and provide recommendations for harmonization of the term.
- **Purchase of right-of-way for utility relocations.** Some states purchase right-of-way for use by public utilities, while others do not. States that have this ability reported that it can significantly reduce challenges associated with project delivery schedules. It would be useful to determine which states have this ability, which conditions need to be met, which challenges are not addressed, and whether the policy has been a useful tool for that state.
- **Innovative practices to deal with safety requirements.** It was found that, outside of DOT project development, safety and traffic control were the most important issues for DOTs in managing utility installations on controlled access right-of-way. Researchers could survey state DOTs to identify innovative practices and successful strategies to deal with safety issues related to utility installations on controlled access right-of-way.

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APPENDIX A

Survey Questionnaire

EMAIL TO POTENTIAL PARTICIPANTS

From: NCHRP Staff

To: Survey participants (members of AASHTO Highway Subcommittees on Right of Way and Utilities)

Subject: Survey of Exemplary Practices for Managing Longitudinal Utility Installations on Controlled Access Highway Right-of-Way

As part of the National Cooperative Highway Research Project (NCHRP) Synthesis Topic 44-11, the Texas A&M Transportation Institute (TTI) is conducting research to document exemplary practices of state transportation agencies (STAs) regarding the management of longitudinal utility installations on controlled access right-of-way. Part of the study involves conducting a survey of STAs to determine these exemplary practices.

All states have accommodation policies for the management of longitudinal utility installations on controlled access right-of-way, but there is little information on comparative experience or on exemplary practices to help other states with implementing new practices. This is especially critical as right-of-way becomes more congested with utility installations. STAs may need to review allowing longitudinal utility installations on controlled access highways, which had previously been off-limits in many states except in hardship or special cases.

The questionnaire has 11 questions, and you will be asked to complete only a subset of these based upon your agency's experience with utility management strategies. Trial use in a survey pre-test shows that the questionnaire can be easily completed within 15 to 30 minutes.

Completing the survey is voluntary. If at any point during the survey you wish to discontinue simply close your browser. No data will be submitted to the study team until you press the "Submit" button at the end of the survey. The final report will only present aggregated results. To ensure confidentiality, all records will be kept private and no respondent identifiers will be included in the report. Information about you and related to this study will be kept confidential to the extent permitted or required by law. People who have access to your information include the Principal Investigator and study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

For questions about your rights as a participant; or if you have questions, complaints, or concerns about the study, you may call the Texas A&M University Human Subjects Protection Program office at (979) 458-4067 or irb@tamu.edu. The survey's IRB protocol number is IRB2012-0692, the IRB approval date is 02/07/2013, and the IRB expiration date is 01/31/2016.

To proceed with the survey, please follow these instructions:

- To view and print the entire questionnaire, click on the following link and print using "control p": NCHRP 20-05 44-11.
- To save your partial answers and complete the questionnaire later, click on the "Save and Continue Later" link in the upper right hand corner of your screen. A link to the incomplete questionnaire will be emailed to you from SurveyGizmo. To return to the questionnaire later, open the email from SurveyGizmo and click on the link. We suggest using the "Save and Continue Later" feature if there will be more than 15 minutes of inactivity while the survey is opened, as some firewalls may terminate due to inactivity.
- To pass a partially completed questionnaire to a colleague, click on the on the "Save and Continue Later" link in the upper righthand corner of your screen. A link to the incomplete questionnaire will be emailed to you from SurveyGizmo. Open the email from SurveyGizmo and forward it to a colleague.
- To view and print your answers before submitting the survey, click forward to the page following question 11. Print using "control p."
- To submit the survey, click on "Submit" on the last page.

The deadline to complete the survey is 02/22/2013. If you are not the appropriate person at your STA to complete this questionnaire, please forward it to the correct person.

If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have.

Your input is critical. Thank you in advance for participating. Please contact Edgar Kraus at any time if you have any questions or need any additional information.

Sincerely,

[Email signature]

SURVEY FORM

NCHRP Topic 44-11 Survey Questionnaire

January 2013

Note: The following definitions are used in this questionnaire:

- **Controlled access right-of-way:** right-of-way used for interstates, freeways, expressways, and hybrids (freeway/expressway mixes).
- **Utility corridor:** a specified zone within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice.

For demographic purposes, please provide the following:

Name: _____

Title:_____

Agency: _____

Division, Office, or Bureau: _____

Mailing address: _____

Phone number:_____

Email address: _____

1. Where is your office located? Select the option most closely matching your main job responsibilities.

☐ Agency headquarters

☐ Agency district or regional branch

2. Does your agency manage longitudinal utility installations in controlled access right-of-way?

☐ Yes

☐ No

[If yes, proceed with 2.1, if no proceed with 2.2.]

2.1. Please provide the name (and if possible, web address) of the document(s), state statute(s), or other that describes your agency's procedure(s) or process(es) for managing longitudinal utility installations in controlled access right-of-way:

☐ State utility manual web address: _____

☐ State permitting manual web address: _____

☐ State utility accommodation rule/policy web address: _____

☐ Other (please describe:)

_____ web address: _____

_ _____ web address: _____

_____ web address: _____

2.2. Please provide the name (and if possible, web address) of the document(s), state statute(s), or other that prevents or prohibits utility owners from using controlled access right-of-way for longitudinal utility installations:

_____

_____

_____

3. How much input do utility owners have in developing procedures or processes for managing utilities on controlled access right-of-way?

_____

_____

_____

4. What are the main problems that your agency encounters with the management of longitudinal utility installations on controlled access right-of-way?

4.1. During permitted installations and operations (outside of project development):

_____

_____

_____

4.2. During project development/project delivery:

_____

_____

_____

5. Does your agency use a procedure or process to manage longitudinal utility installations on controlled access right-of-way that is not included in published policies or statutes?

☐ Yes

☐ No

[If yes, proceed with 5.1, if no proceed with 6.]

5.1. Please describe the procedure or process your agency uses to manage longitudinal utility installations on controlled access right-of-way:

_____

_____

_____

5.2. Does your agency have a different procedure or process to manage longitudinal utility installations on controlled access right-of-way depending on whether it is a rural versus an urban location?

☐ Yes

☐ No

[If yes, proceed with 5.2.1, if no proceed with 6.]

5.2.1. Please describe differences between managing longitudinal utility installations on controlled access right-of-way in rural and urban locations:

_____

_____

_____

6. Does your agency have a process by which utility owners propose the location where they are permitted to install their facilities?

☐ Yes

☐ No

[If yes, proceed with 6.1, if no proceed with 7.]

6.1. Please list the step-by-step process by which utility owners propose the location where they are permitted to install their facilities:

_____

_____

_____

Utility corridor: a specified zone within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice.

7. Does your agency use utility corridors to manage longitudinal utility installations on controlled access right-of-way?

☐ Yes

☐ No

[If yes, proceed with 7.1, if no proceed with 8.]

Utility corridor: a specified zone within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice.

7.1. Please provide your definition of a utility corridor, if different from our definition given above:

_____

_____

_____

7.2. Does your agency use utility corridors for transverse crossings, longitudinal installations, or both?

☐ Transverse crossings

☐ Longitudinal installations

7.3. Under which circumstances or specific scenarios does your agency make use of utility corridors on controlled access right-of-way?

_____

_____

_____

8. Does your state have a policy to accommodate infrastructure that supports renewable energy sources (also characterized as utilities) on controlled access right-of-way as noted in FHWA's "Guidance on Utilization of Highway Right-of-Way"? (For more information see http://www.fhwa.dot.gov/realestate/guidutil_a.htm).

☐ Yes

☐ No

[if yes, proceed with 8.1, if no proceed with 9.]

8.1. Please provide the name (and web address, if possible) of the document(s) that describes your agency's policy to accommodate infrastructure that supports renewable energy sources on controlled access right-of-way:

_____ web address: _____

_ _____ web address: _____

_____ web address: _____

9. Is there a procedure or process that your agency uses to manage longitudinal utility installations on controlled access right-of-way that you would consider a best practice?

☐ Yes

☐ No

[If yes, continue with 9.1, if no continue with 10.]

9.1. Please describe the best practice:

_____

_____

_____

10. Is there anyone else at your agency we should contact for additional information regarding best practices for managing longitudinal utility installations on controlled access right-of-way?

☐ Yes

☐ No

[If yes, continue with 10.1, if no continue with question 11.]

10.1. Please provide contact information:

Name: _____

Title:_____

Division, Office, or Bureau: _____

Phone number: _____

Email address: _____

11. Are you aware of a local or municipal agency that has a utility management practice that may be of interest to this study?

☐ Yes

☐ No

[If yes, continue with 11.1, if no continue with 12.]

11.1. Please provide contact information:

Name: _____

Title:_____

Division, Office, or Bureau: _____

Phone number:_____

Email address:_____

12. Submit Survey Button

Submission Acknowledgement

Your responses have been submitted. On behalf of the Transportation Research Board and the Texas A&M Transportation Institute, thank you for your participation! If you indicated further interest, we will follow up with you shortly. For questions or suggestions, please contact Edgar Kraus at 210-979-9411 Ext. 17202 or e-kraus@tamu.edu.

APPENDIX B

Survey Results and Discussion

Question 1 – Survey Respondent Demographics

The study team received 45 responses from 43 DOTs (two DOTs sent two responses each), which is equivalent to a state response rate of 84%. Not surprisingly, most DOTs decided to consolidate their answers and have one individual provide a response on behalf of the agency. Figure B1 provides an overview of the states responding to the survey. Out of 45 participants responding to the survey, 44 worked at agency headquarters and one respondent worked at an agency district or regional branch.

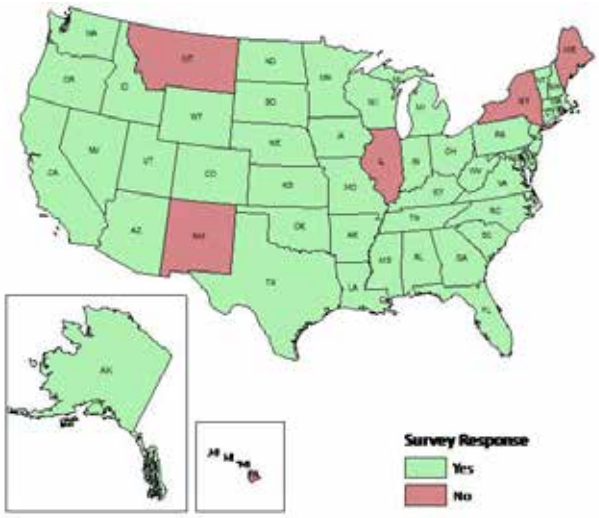

FIGURE B1 Map of state agencies responding to the survey.

Question 2 – Management of Longitudinal Utility Installations on Controlled Access Right-of-Way

Does your agency manage longitudinal utility installations on controlled access right-of-way?

A total of 40 state agencies responded that they manage longitudinal utility installations on controlled access right-of-way; three states responded that they do not manage these installations; and eight states did not provide a response, as shown in Figure B2.

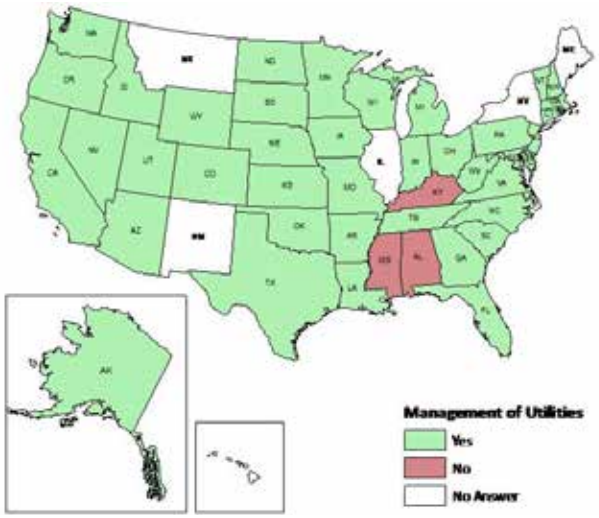

FIGURE B2 State departments of transportation managing longitudinal utility installations on controlled access right-of-way.

The study team combined the responses with data from previous surveys conducted by AASHTO and NCHRP to fill in some of the gaps in Figure B2. As a result, there are currently 45 DOTs that manage longitudinal utility installations on controlled access right-of-way. Since the last survey in 2009, nine states changed their policy, seven of which now allow this type of utility installations, and two states that no longer allow this type of utility installation (Kentucky and Mississippi). Figure B3 provides an overview of data from this survey with additional information from the 2009 AASHTO survey (*35*).

It was noted that although a DOT may respond that the state does manage longitudinal utility installations on controlled access right-of-way, it may have a policy that in general does not allow such installations. For example, several states, including Florida, prohibit the use of controlled access right-of-way for longitudinal utility installations but provide a process by which utility owners can receive an exception. Once a utility receives access to controlled access right-of-way, the state begins managing longitudinal utility installations on controlled access right-of-way, although its policy may prohibit these installations. Overall there are varying degrees of how willing DOTs are to provide access to the controlled access right-of-way, ranging from installations on exception and hardship bases only to policies that describe the circumstances and process that allow certain types of utilities on controlled access right-of-way.

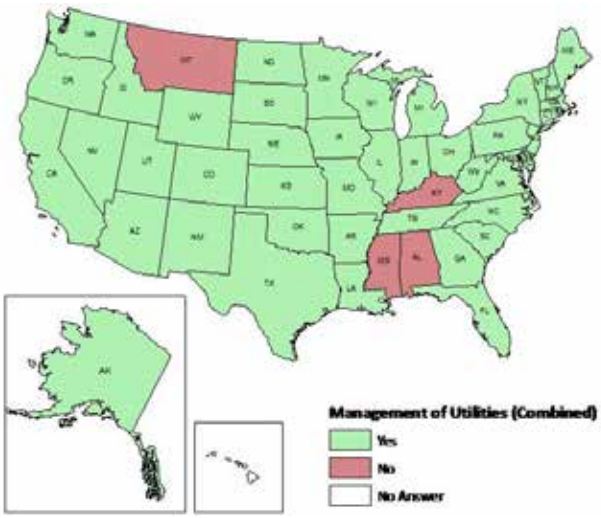

FIGURE B3 State departments of transportation managing longitudinal utility installations on controlled access right-of-way [based on survey data and 2009 AASHTO Survey (*35*)].

Question 2.1 – Documents Describing Agency Management Procedures

Please check the name (and, if possible, provide the web address) of the document(s), state statute(s), or other that describes your agency's procedure(s) or process(es) for managing longitudinal utility installations on controlled access right-of-way.

At the beginning of the questionnaire, the following definition for controlled access right-of-way was provided: right-of-way used for interstates, freeways, expressways, and hybrids (freeway/expressway mixes). Survey respondents had the option to select one or more of the following document types to account for situations where a DOT uses more than one document to manage utilities on controlled access right-of-way:

- State utility manual.
- State permitting manual.
- State utility accommodation rule/policy.
- Other.

Thirty-nine DOTs responded to the question. Table C1 in Appendix C provides an overview of the document types, names, and web addresses provided by survey respondents.

As shown in Figure B4, many states rely on only one document, but the majority of states use more than one document type.

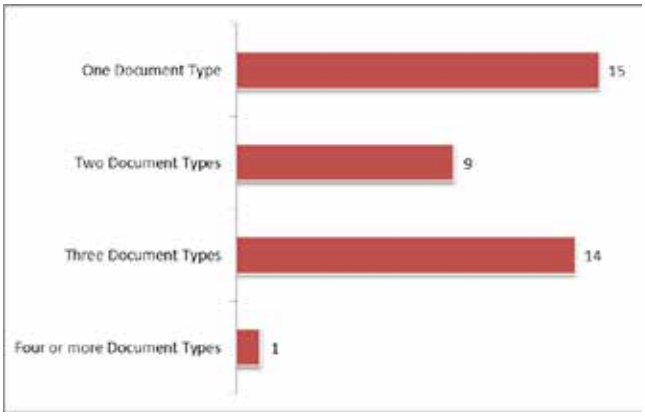

FIGURE B4 Number of DOTs that use one or more document types to manage longitudinal utilities on controlled access right-of-way (*n* = 39).

Based on the definition for controlled access right-of-way provided, 33 DOTs (85% of respondents) said that the state's utility accommodation rule or policy contains the procedures for managing longitudinal utility installations on controlled access right-of-way (Figure B5).

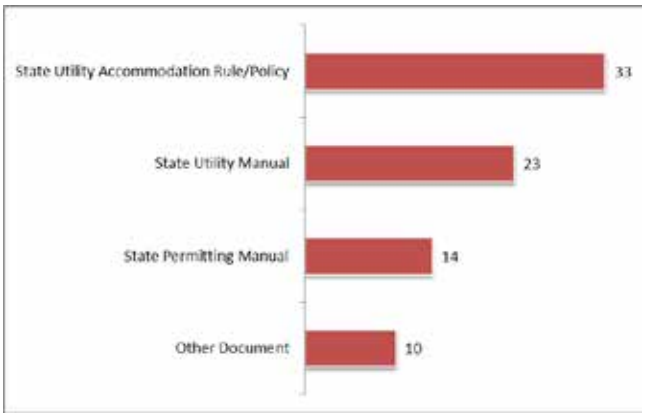

FIGURE B5 Number of DOTs that use a type of document to manage longitudinal utilities on controlled access right-of-way (*n* = 80).

Twenty-three DOTs (slightly more than half) responded that procedures are described in a state utility manual, and 14 DOTs (about one third) responded that procedures are described in a state permitting manual. Ten DOTs said that procedures are described in another type of document. Documents mentioned in the "Other" category included federal regulations (23 CFR 645,) the FHWA Utility Guide, references to state statutory law, the AASHTO policy on accommodation of utilities, and state-specific manuals such as the Missouri Engineering Policy Guide (1). Since 33 of 39 DOTs responding are using a state utility accommodation rule or policy, it follows that six DOTs are not using a state utility accommodation rule or policy.

Of the 33 states that use the state accommodation rule or policy to manage longitudinal utility installations on controlled access right-of-way, 10 DOTs responded that it is the state's only source of management procedures (Figure B6). Eight DOTs responded they have one additional document, which is usually a state utility manual, and 14 DOTs responded that they use two additional documents, usually a state utility manual and a state permitting manual. One DOT (Vermont) responded that the state uses a state utility manual and a state permitting manual, and also refers to access management guidelines as needed.

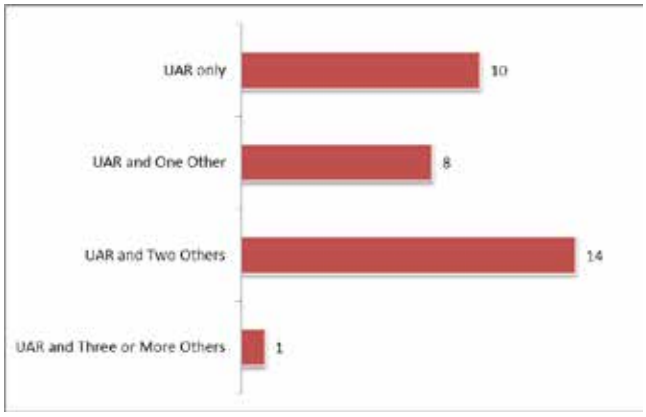

FIGURE B6 Number of DOTs that use state utility accommodation rule/policy exclusively or with other documents (n = 33).

Six states—California, Connecticut, Delaware, Massachusetts, Missouri, and New Hampshire—responded that their DOT's procedures or processes for managing longitudinal utility installations on controlled access right-of-way are not included in the state's utility accommodation policy or rule. Connecticut, Delaware, and New Hampshire rely on the state utility manual only; California uses both state utility manual and state permit manual; Massachusetts did not provide a specific resource; and Missouri uses its Engineering Policy Guide (Figure B7).

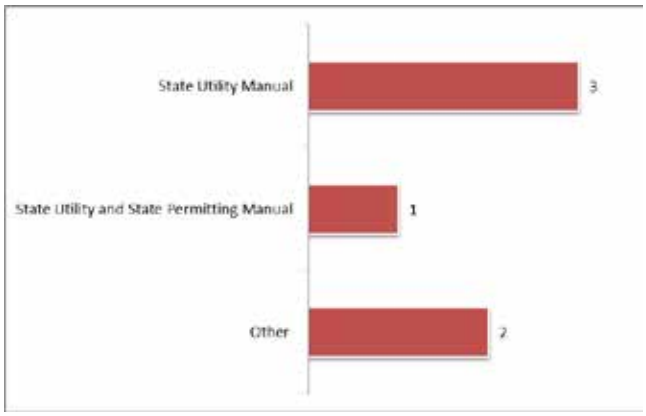

FIGURE B7 Number of DOTs that use documents other than state utility accommodation rule/policy (n = 6).

Question 3 - Utility Owner Input into Development of Management Procedures

How much input do utility owners have in developing procedures or processes for managing utilities on controlled access right-of-way?

This question did not provide answer options but gave respondents the freedom to respond in an open text field. The study team received 41 responses, two of which replied that the question did not apply to them since the DOT does not allow longitudinal placement of utilities on controlled access right-of-way. Of the remaining 39 responses, six DOTs said that utilities have no input in the development of management procedures, and 33 stated that utilities have little or some input into the process (Figure B8).

The states that do not allow input into the process are Connecticut, Maryland, Michigan, Mississippi, New Hampshire, and Washington; Mississippi said that it does not manage longitudinal utility installation on controlled access right-of-way.

From the responses provided, it was found that respondents understood the question in different ways, based on their different perspectives. Although each DOT has its own unique procedures to manage utilities on controlled access right-of-way, DOTs have in common that there are typically several levels at which the management of utilities is defined or prescribed: state utility accom-

modation rules (based on federal rules and regulations), state utility or permitting manuals, agency standard operating procedures, and local implementation guidelines.

The question's wording was intentionally open to allow a response to management procedures at any level, but respondents did not always provide sufficient detail to allow the study team to determine their perspective. For example, the study team did not expect any responses stating that utilities do not have any input in the process at all, given that state accommodation rules are developed with input from the public, including utility owners and other stakeholders. However, agency standard operating procedures and local implementation guidelines are internal agency documents that may exist in the form of memoranda or agencywide notifications, and in some cases as undocumented agency policies. Utility companies would not be expected to have any input into these types of documents. From that perspective, it is understandable that some respondents simply stated that utilities do not have any input into the development of management procedures.

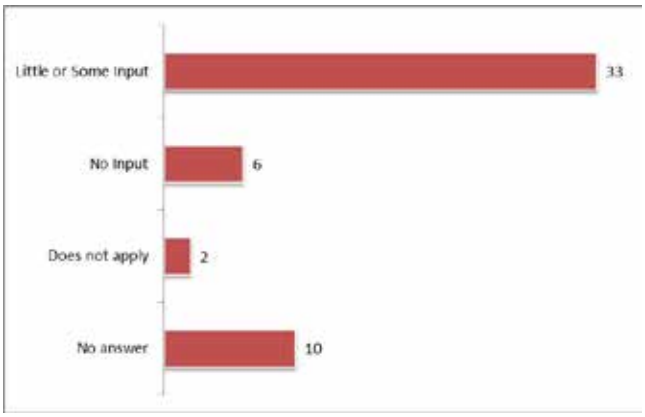

FIGURE B8 Level of input by utility owners into development of utility management procedures (n = 51).

The responses of the group of 33 respondents who said that utility owners have at least little or some input into the process were further reviewed. The analysis found that all respondents mentioned that utility owners have input during the public comment period of an administrative rule revision. A few DOTs stated that this input is often enhanced through proactive pursuits such as lobbying or petitioning on behalf of the utility owners. Respondents also mentioned the following examples of how utilities can provide input to accommodation procedures outside of the rulemaking process:

- North Carolina is actively reaching out to utility owners to provide feedback on existing rules and procedures, and is open to suggestions and ideas. Wisconsin encourages utilities to suggest changes regarding existing policies and reaches out to utility industry stakeholders for their input at regularly scheduled quarterly meetings and annual regional utility conferences.
- Arkansas and Georgia participate in joint committees with utility owners to update utility accommodation policies and procedures.
- In Utah, utility owners may have the opportunity to provide input at annual or semi-annual meetings between the DOT and utility owners. California and Georgia have utility coordination councils that meet on a regular basis with major utility companies.
- Several DOTs mentioned that they provide an opportunity for comments when the state utility manual is being updated and is posted for public comments. During the development of the state utility manual, utility companies receive a copy to review.
- Minnesota responded that utility owners can provide informal input such as concerns, opinions, and beliefs at any time; for example, to the utility engineer or at events such as utility owner focus groups and training sessions. When utilities provide feedback, the DOT will review them and determine a plan of action.

About half of the 33 respondents provided one or more of these examples of DOT activities to actively engage and reach out to utility owners, while the other half did not provide examples of utility input in addition to the rulemaking process.

Question 4 – Management of Longitudinal Utility Installations on Controlled Access Right-of-Way

Question 4.1 – Management of Longitudinal Utility Installations on Controlled Access Right-of-Way Outside of Project Development

What are the main problems that your agency encounters with the management of longitudinal utility installations on controlled access right-of-way during permitted installations and operations (outside of project development)?

Figure B9 shows that in response to question 4.1, 18 DOTs described some type of issue with the management of longitudinal utility installations on controlled access right-of-way: seven described more than one issue, eight did not have any issues, eight responded that the question did not apply, and 10 did not provide a response.

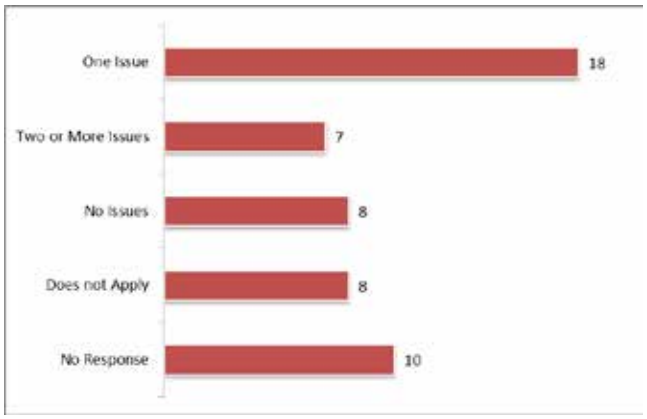

FIGURE B9 Issues with management of longitudinal utility installations on controlled access right-of-way ($n = 51$).

Of those DOTs that reported no particular issues, most clarified that the DOT had approved either none or only a small number of longitudinal installations and had not encountered any significant problems during the approval process. Of the DOTs that said that the question does not apply, most stated that they do not allow such installations or only allow installations through a hardship, exception, or variance process defined by state law.

Of the DOTs that did provide examples of management issues, many were concerned about a potential negative impact that longitudinal utility installations could have on the safety of the traveling public and how utility installations could produce a delay and/or affect the road level of service during installation and maintenance activities. For example, several DOTs were concerned that utility owners would not complete an installation in a timely manner or would not comply with the state's utility accommodation rules. Several DOTs provided examples of noncompliance issues:

- The utility owner might not provide sufficient information in the permit application to accurately locate the proposed location of its facilities within the right-of-way.
- The utility owner might not use adequate traffic control during construction and might not have sufficient provisions to ensure that the permitted operation does not adversely affect traffic during peak hour conditions. Some DOTs oblige utility owners to work during the night, from 7 p.m. to 5 a.m.
- A utility owner might install facilities in a location other than the location permitted by the agency and shown on the design plans, might not install facilities within the designated limits of a utility corridor, or might not install facilities at a required depth.
- The utility owner might not perform sufficient erosion control and/or restore the right-of-way adequately upon completion of the installation.

In addition to these issues, survey participants frequently mentioned that they have difficulty establishing and maintaining utility ownership information, and that it is difficult to establish a fair valuation of the access that is granted to a utility owner. In a related comment, one DOT mentioned that it is very difficult to obtain compensation from a utility owner for the release of scenic easement rights and, more specifically, it is difficult to appraise the value of those rights for affected parties.

Figure B10 shows the frequency of various issues mentioned by survey participants. For example, seven DOTs mentioned that safety and traffic control is a frequent issue when dealing with longitudinal utility installations on controlled access right-of-way during permitting, outside of project development.

The "Other" category shown in Figure B10 is a count of unique issues that survey participants mentioned, including the following:

- One DOT mentioned that it is a challenge to find the resources to adequately educate district staff about the complex requirements for longitudinal utility installations on controlled access right-of-way.
- One DOT reported that there is political pressure to allow the longitudinal occupation of controlled access right-of-way by utilities. Political pressure often occurs when local governments want to use these areas for economic reasons.
- One DOT reported that although utility installations on controlled access right-of-way are not allowed, the DOT has problems with electrical transmission lines that encroach into the right-of-way air space. In some cases, the overhanging facility was allowed to encroach into the right-of-way because a modification of the line would have significantly impacted agricultural activities outside the right-of-way, and because state utility accommodation rules allow encroachment exceptions under certain circumstances.
- One DOT reported an issue with the mitigation of poles that have had a history of collisions and are located within the control or clear zone.
- One DOT mentioned that some installations require the removal of trees and other vegetation that the DOT uses for snow control. In this case, it is difficult to weigh the interests of the utility owner against the purpose of the vegetation to safeguard traffic operations during snow conditions. However, some utilities have worked with DOTs to come up with vegetation replacement plans that use low-growth vegetation for snow control while at the same time allow the utilities to maintain their electric safety code clearances.
- One DOT said that utility owners often do not provide adequate as-built drawings after construction or may not provide any as-built drawings at all.
- One DOT mentioned that utility owners might remove the DOT's right-of-way markers during construction.
- One DOT reported that utility companies complain that the permit approval process takes too long.

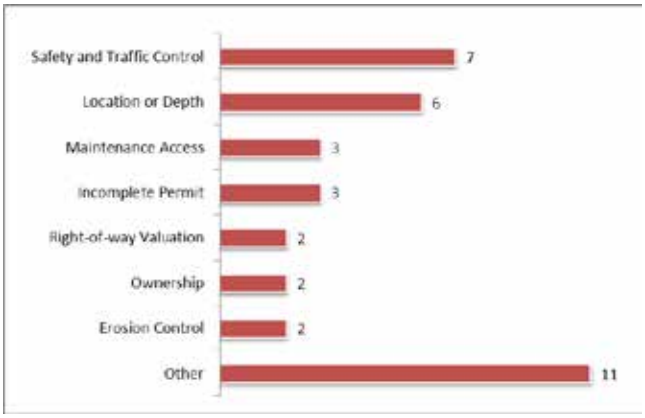

FIGURE B10 Management outside of project development: frequency of issue mentioned by DOTs (25 DOTs responded).

In the view of the study team, the frequency by which DOTs mentioned certain types of issues should not be given too much significance. Since DOTs were given an open text question, it is likely that respondents did not think of all issues at the time the survey was filled out, but rather mentioned the most pressing issues. For example, it is likely that more than just one DOT does not receive adequate as-built information upon completion of a utility project.

Question 4.2 - Management of Longitudinal Utility Installations on Controlled Access Right-of-Way During Project Development

What are the main problems that your agency encounters with the management of longitudinal utility installations on controlled access right-of-way during project development/project delivery?

Figure B11 shows that in response to question 4.2, 26 DOTs described some type of issue with the management of longitudinal utility installations on controlled access right-of-way, five DOTs did not report any issues, nine DOTs responded that the question did not apply, and 11 DOTs did not provide a response.

Figure B12 provides the frequency of various issues mentioned by survey participants. For example, eight DOTs mentioned that utility coordination is a frequent issue when dealing with longitudinal utility installations on controlled access right-of-way during project development.

The "Other" category shown in Figure B12 is a count of unique issues that survey participants provided, including the following:

- One DOT mentioned that its main challenge is to find feasible alternatives when reviewing and determining solutions to utility conflicts.
- One DOT stated that it is mainly concerned about the compliance of utility owners with the state's Utility Accommodation Manual.
- One DOT stated that regardless of whether installations are requested during project development or permitted operations, the main issue is political pressure to allow longitudinal utility installations on controlled access right-of-way. Political pressure often originates from local governments that have an economic motivation to request the access.
- One DOT stated a main concern that new installations would conflict with future roadway improvements.
- One DOT stated that the main issue is typically coordination with the highway contractor, since most of the longitudinal utility installations on controlled access right-of-way occur during highway construction.

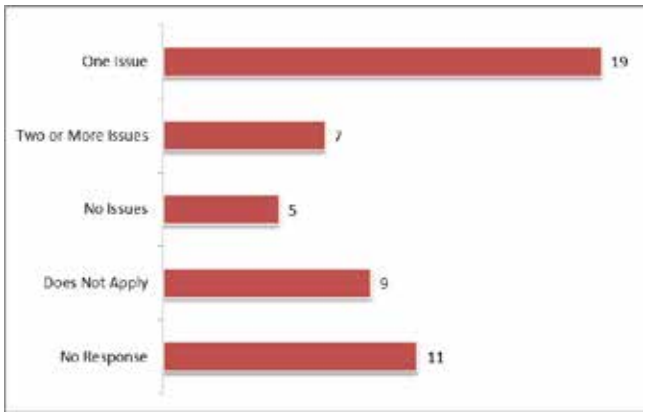

FIGURE B11 Issues with management of longitudinal utility installations on controlled access right-of-way (n = 51).

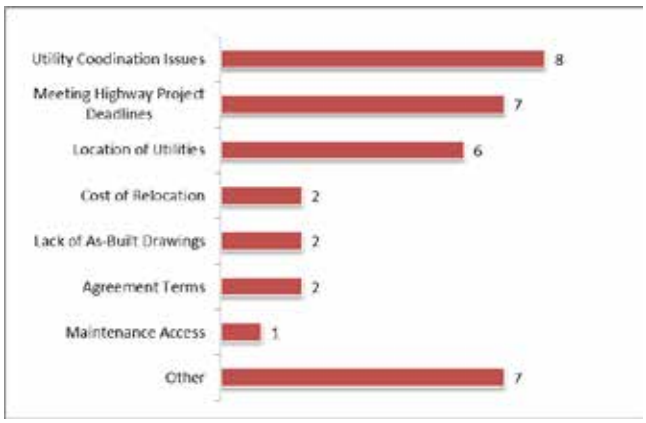

FIGURE B12 Management during project development/project delivery: frequency of management issue mentioned by DOTs (26 DOTs responded).

Question 5 – Unpublished Procedures and Processes to Manage Longitudinal Utility Installations on Controlled Access Right-of-Way

Does your agency use a procedure or process to manage longitudinal utility installations on controlled access right-of-way that is not included in published policies or statutes?

Survey respondents said that, for the most part, DOTs follow processes and procedures that are published in manuals and statutes. As shown in Figure B13, seven DOTs responded that they do use unpublished procedures, 35 answered that they do not use any unpublished procedures, and nine DOTs did not respond. Figure B14 is a color-coded map of DOTs according to the responses provided to question 5.

For those DOTs that answered question 5 affirmatively, a follow-up question asked respondents to describe the procedure or process in more detail. Although responses were generally brief, a few common elements among the responses were found. Some DOTs pointed out that procedures for the most part are provided by manuals and statutes, but processes can be influenced by local circumstances. For example, larger or more populous districts may have more staff and more requests for certain types of utility installations. As a result, these districts may have different processes to manage those types of utility installations. The following is also noted:

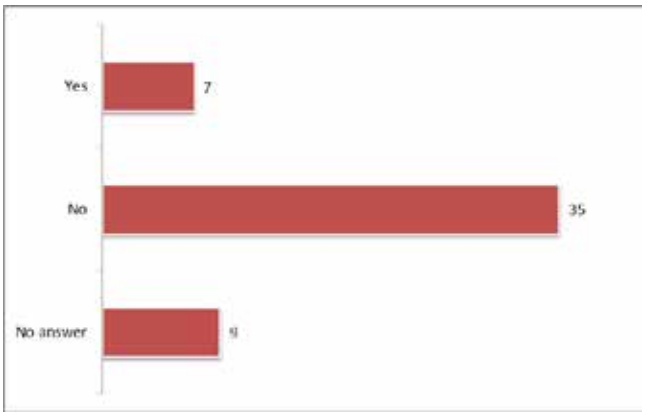

FIGURE B13 DOT use of an unpublished process or procedure to manage longitudinal utilities on controlled access right-of-way (n = 51).

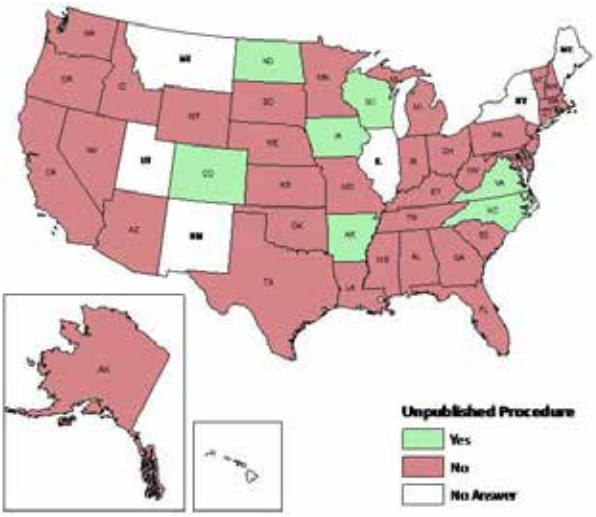

FIGURE B14 DOT use of an unpublished process or procedure to manage longitudinal utilities on controlled access right-of-way.

- Some states so far have approved only a few longitudinal installations, and the procedure for approval varies considerably based on the circumstances of the installation.

- Some states encourage utility owners to share trenches and/or conduit during construction. Respondents said that although shared trenching is a great idea in theory, this type of coordination is very difficult and is rarely successful in the field.
- Some information about the coordination process might not be included in manuals or statutes but might simply be provided on the utility permit document. For example, some states provide on the utility permit that the utility owner must coordinate the details of the installation with the DOT district permit coordinator.
- Some states request utility owners to place a line within a certain distance of the right-of-way line (e.g., 15 ft) that is not required by law but rather is an accepted engineering practice. If the utility owner is unable or unwilling to comply with the request, exceptions can be negotiated with DOT personnel.
- The Wisconsin DOT noted that for planned electric transmission projects, it works directly with the state regulatory agency that oversees the electric transmission industry, the Public Service Commission (PSC). The coordination with the PSC begins prior to the public information process and continues through many stages of project development, including draft environmental impact statement (EIS), final EIS, public hearings, and final decision (order). Depending on the project, coordination with the PSC might continue during the design, permitting, and construction process. This coordination ensures that the DOT's perspective and requirements are shared with the utility owner, and that all parties are aware that the DOT may or may not be able to accommodate the project on state controlled access highway right-of-way.

If a DOT responded that it does have procedures not included in published policies or statutes, the study team also inquired whether the DOT has different procedures or processes for managing longitudinal utility installations on controlled access right-of-way depending on urban versus rural project location. Of the seven responses that were received, four DOTs reported that they do not manage utilities differently, two reported that they do manage utilities differently, and one did not provide an answer. The two DOTs that manage utilities differently (Virginia and Wisconsin) provided a few examples of these differences; for example, work times in urban areas can be more restrictive. Due to traffic volumes in urban areas, the DOT might require that work be performed overnight, especially when a lane or shoulder closure is required. There is also less space for utility installations in urban areas and a greater risk for a utility to conflict with obstacles such as retaining walls, sound barriers, and bridge abutments.

The Wisconsin DOT said it has a per mile longitudinal fee for utility installations on controlled access right-of-way, which includes a factor that is based on the annual average daily traffic (AADT) count. As a result, the installation fee is higher in urban areas. The DOT also noted that in urban areas, utility owners need access from the highway shoulder more often than in rural areas.

Question 6 – Involvement of Utility Owners in Determining the Location for Utility Facilities

Does your agency have a process by which utility owners propose the location where they are permitted to install their facilities?

Survey respondents said that, for the most part, DOTs have a process by which utility owners can propose the location for new utility installations. Thirty-eight DOTs responded they do have such a process, four DOTs responded that they do not have such a process, and nine DOTs did not provide a response. Figure B15 provides an overview of the responses by DOTs to question 6.

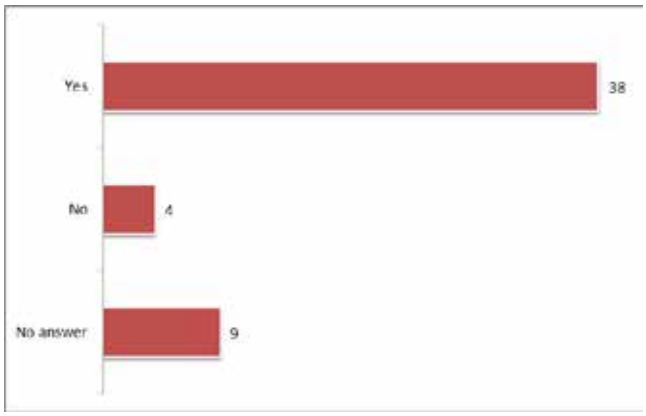

FIGURE B15 DOT use of a process by which utility owners propose the location where they are permitted to install their facilities (n = 51).

For those DOTs that answered question 6 affirmatively, a follow-up question asked respondents to describe the process step by step. In total, 35 DOTs provided a description outlining the steps.

It was found that, for the most part, respondents did not differentiate between the regular process for utility facility placement and a separate process for utilities on controlled access right-of-way. Typically, utility owners submit a permit application that includes general information about a preferred location for the utility facility. The DOT will review the request, determine if the accommodation is feasible, and then ask for specific details about the location in the form of design drawings. DOTs mentioned the following considerations for determining the location of utility installations:

- Type of highway.
- Presence of other utilities.
- Local vegetation issues.
- Scenic classification of the location.
- Maintenance/access aspects for both the utility and the agency.

Following the request, the DOT and utility owner representatives may have field or office meetings to discuss concerns, potential design revisions, and redesign needs. These typically occur at the district level and involve district utility coordinators. In the case of electric transmission line installations, there are often numerous meetings that involve the utility, the DOT, and possibly other agencies such as the public service commission in order to determine a final corridor location. Once all parties can agree on the location, the DOT works with the utility owner to determine the final design alignment.

Some DOTs require the utility to mark existing lines in the field to determine potential conflicts. DOTs sometimes have a target zone (e.g., 5 ft from the right-of-way line) where they try to place utility installations. The DOT then reviews the detailed information to ensure compliance with accommodation rules and either makes a decision or requests further information.

Utility permits are typically approved or denied at the local or regional level. A central office often gets involved if the utility installation is unusual or requires some type of compensation. Thus, a central office typically gets involved when a utility owner requests a permit for an installation on controlled access right-of-way.

For example, some DOTs have or work with a review committee (Shared Resource Committee, Board of Public Works) that reviews corridor locations that utility owners have requested. If they approve a request, the committee asks for detailed plans that are reviewed jointly by the committee, the district engineer, and a utility section representative. Following the review, the committee issues a recommendation to the right-of-way division on whether to issue a permit or not.

Other DOTs reported that they simply route permit requests through various divisions for comment. This process is more time-consuming, and it may take several months until all divisions involved in the process have reviewed the permit request. When a permit is approved, it may be returned to the utility owner for notification or forwarded to FHWA, depending on whether the DOT has approval authority or not.

A few DOTs noted that although utilities might be prohibited from placing facilities on controlled access right-of-way within the state, they nevertheless submit applications to do so. Some utility owners are unaware of the fact, while others simply attempt to avoid the lengthy process of getting an exception to policy for their installation.

One DOT mentioned that occupancy of utility facilities on controlled access occurs usually via a resource sharing agreement. In practice, one or more utility owners will submit preliminary plans proposing a utility corridor that should be located as close to the right-of-way line as possible. The DOT evaluates the preliminary plans, conducts a site review, and then requests final plans. Once the utility owner provides the final plans, the DOT will review them and come to a decision on the utility corridor installation.

Question 7 – DOT Use of Utility Corridors

Does your agency use utility corridors to manage longitudinal utility installations on controlled access right-of-way?

At the beginning of question 7, a definition for a utility corridor was provided: a specified zone within the right-of-way where multiple longitudinal utilities are required to be located by agency policy or practice. Based on this definition, 15 states said they use utility corridors, 24 responded that they do not use utility corridors, and 12 states did not provide an answer. Figure B16 provides an overview of the DOT responses to question 7. Figure B17 shows the geographic distribution of states that use utility corridors in the United States.

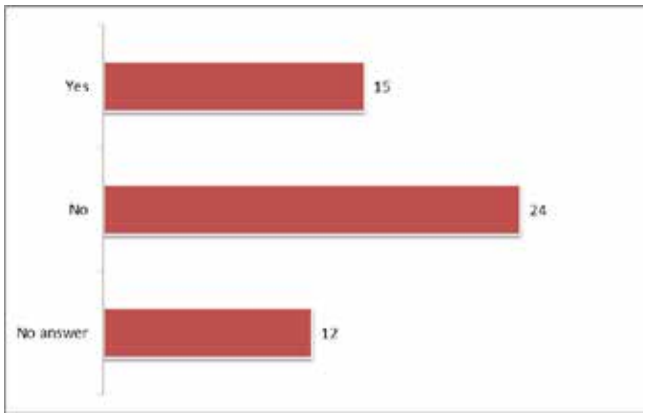

FIGURE B16 DOT use of utility corridors to manage longitudinal utility installations on controlled access right-of-way (n = 51).

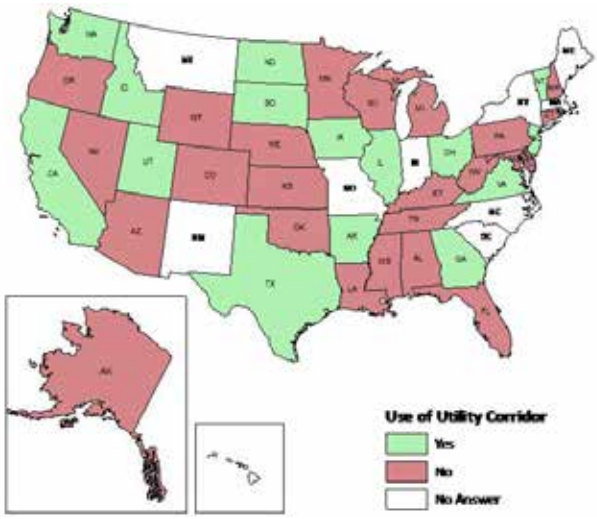

FIGURE B17 DOTs that use utility corridors to manage longitudinal utility installations on controlled access right-of-way.

The study team asked whether their definition of utility corridor provided was appropriate or whether survey respondents used a different definition. Nine DOTs provided a response: six commented on the definition provided, and three provided a different definition. For example, Georgia commented that the definition is correct but added that utility corridors are limited to areas where roadways have frontage roads. Indiana commented that the DOT uses utility corridors outside the area confined by a security fence but within the state right-of-way. Such utility corridors are only authorized in locations that will not affect traffic movement during utility maintenance operations. Similarly, the Pennsylvania DOT reported that it creates a utility corridor by moving the line designating limited access inward from the right-of-way line. Utilities can then install facilities in the area between the two lines. The DOT determines the width of the utility corridor based on available right-of-way and minimum utility requirements. Ohio reported that it makes efforts on some projects to acquire additional right-of-way for exclusive utility use, depending on the availability of such right-of-way in the project corridor.

Three states provided a different definition for utility corridor. The Utah DOT uses the designation "generalized corridor," which should be located in an area as close to the right-of-way line as possible, not underneath pavement, not in medians, with access points to be located outside of the access control lines. Depending on project constraints, the Utah DOT may require joint occupancy in trenches or on poles. The Texas DOT uses the designation "utility strip," which is defined as "the area of land established within a control of access highway, located longitudinally within the area between the outer traveled way and the right-of-way line, for the nonexclusive use, occupancy, and access by one or more authorized public utilities." Texas uses utility strips only as an exception to the general accommodation rules, if requested by a utility owner. The South Dakota DOT defines a utility corridor as "an easement other than right-of-way for multiple utilities to occupy."

If respondents replied that they use utility corridors, the questionnaire followed up by asking whether DOTs use utility corridors for transverse crossings, longitudinal installations, or both. In total, 14 DOTs responded to the question: seven DOTs use utility corridors for longitudinal installations only, six use utility corridors for both longitudinal and transverse crossings, and one DOT uses utility corridors for transverse crossings only.

Of states that reported using utility corridors, the questionnaire asked for a description of the circumstances or specific scenarios under which the DOT makes use of utility corridors on controlled access right-of-way. In many cases, these circumstances were very detailed, so survey respondents provided a reference to the state's administrative code or rule instead of providing a description of specific scenarios. The Arkansas DOT simply responded that all specific requests made by a utility owner will be considered, in addition to utility installations needed for a DOT facility.

The California DOT said that although it allows longitudinal utility installations on state highways, it generally does not permit longitudinal utility installations on controlled access right-of-way, but there may be exceptions. Requests for exceptions are reviewed on a case-by-case basis by a special engineering group at the DOT headquarters.

The Iowa DOT reported that utility corridors are a dedicated area at the outer edge of the right-of-way and can be thought of as a guideline for a zone where utilities can install facilities. If the available space is significantly constrained, the DOT may require the use of a shared trench or conduit. On controlled access right-of-way, the Iowa DOT requires the use of multiduct installations, but there are few examples of such installations in the field.

Other DOTs described some of the conditions that might affect the DOT's decision to designate a utility corridor. For example, the Indiana DOT encourages the development of utility corridors on added capacity projects to lower the impact of utility easements that relocating utility owners might have to purchase, which results in overall accelerated utility relocation. The Ohio DOT might acquire additional right-of-way to establish areas for relocating utilities, if such right-of-way is available. This practice can be very useful in rural areas that typically have more available right-of-way and for projects with rigid timelines, where utility delays could have significant effects. The North Dakota DOT reported that it might allow installations on controlled access right-of-way if a utility owner has no other alternative.

The South Dakota DOT reported that utility corridors are a useful tool when several utility facilities are affected by a controlled access facility and it is in the best interest of the project, landowner, and taxpayer to provide a space for these utilities. The following are common scenarios for utility corridors: (1) when a project has multiple utility owners with adjustment costs that are eligible for reimbursement by the DOT, (2) when a project has utility adjustments in a location where utility owners have experienced difficulties with the acquisition of easements from private landowners, and (3) when there is no space for utility installations on the proposed extent of the right-of-way.

The New Jersey DOT establishes utility corridors for the installation of underground utility facilities where the DOT deems public utility facility installations feasible (*2*). Utility corridors consist of an area contiguous to each side of the roadway's access control line, generally not closer than 30 ft to the edge of the roadway. There is no transverse utility corridor designation, but utility facilities in the utility corridor are allowed to cross the roadway within interchange areas.

The Washington DOT reported that utility corridors are established based on a decision at the regional level when there is an opportunity for joint trenching. For example, if more than one utility has plans to service a development, the DOT encourages the utility owners to coordinate installation activities. This practice reduces the likelihood of damage by one utility owner to the other and might result in less right-of-way affected by utilities.

Question 8 – Accommodation of Renewable Energy Sources

Does your state have a policy to accommodate infrastructure that supports renewable energy sources (also characterized as utilities) on controlled access right-of-way, as noted in FHWA's "Guidance on Utilization of Highway Right-of-Way"? (For more information, see http://www.fhwa.dot.gov/realestate/guidutil_a.htm.)

Figure B18 shows that of the 36 responses to this question, only two DOTs—Minnesota and Wyoming—said that they have a policy to accommodate infrastructure that supports renewable energy sources. Minnesota responded that the DOT is in the process of updating the accommodation policy to include renewable energy sources, while Wyoming stated that current rules already allow such installations. A review of the current Wyoming utility accommodation rules found no reference to renewable energy sources (*3*). However, renewable energy installations might be permissible under a rule that allows encroachments on controlled access right-of-way if they pass an evaluation by the DOT and follow certain minimum criteria.

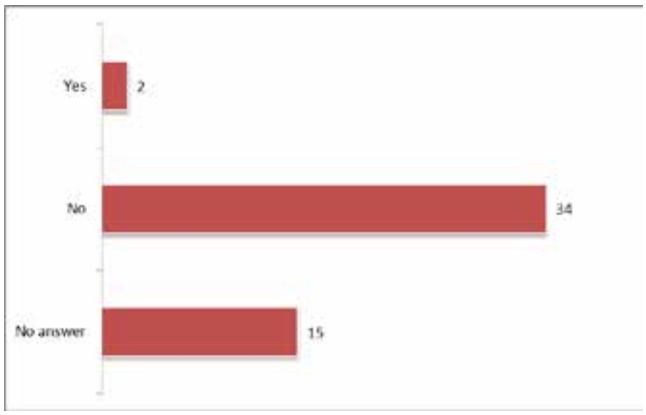

FIGURE B18 DOTs with policy to accommodate infrastructure that supports renewable energy sources on controlled access right-of-way (n = 51).

Question 9 – Best Practices for Managing Longitudinal Utility Installations on Controlled Access Right-of-Way

Is there a procedure or process that your agency uses to manage longitudinal utility installations on controlled access right-of-way that you would consider a best practice?

The study team received 14 responses from DOTs that described a practice or procedure that the respondent considered a best practice (Figure B19). Interestingly, no single best practice was mentioned by more than two DOTs, and only twice was a best practice mentioned by more than one DOT. One of these was the creation of a centralized committee to review requests for installations on controlled access right-of-way. In Arizona, this is the Shared Resource Committee, which serves as the central management and controlling entity of controlled access right-of-way. Similarly, California has an Engineering Assessment Group that is located at its headquarters and reviews requests for exceptions to policy.

The other best practice mentioned by two DOTs was the installation of communication lines within controlled access right-of-way if the DOT has a need or use for the utility. In Utah, the DOT will allow communication utilities on controlled access right-of-way if the utility provides a service to the DOT. Installations may involve conduits that allow future expansion for other communication utilities. The Wisconsin DOT has accepted some corridors with communication utilities on controlled access right-of-way that provide the DOT with access to dark (unused) fiber in lieu of a cash payment. The Wisconsin DOT has been able to use the fiber to connect ITS facilities such as changeable message boards, ramp meters, and traffic cameras. Similarly, the Iowa DOT mentioned that it shares some fiber-optic lines with a communications company that is owned by the state.

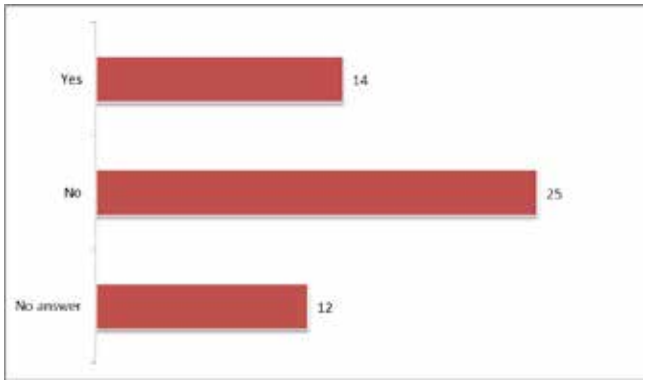

FIGURE B19 DOTs that offered best practice for management of longitudinal utility installations on controlled access right-of-way (n = 51).

The Wisconsin DOT allows the longitudinal occupation of electric transmission lines on controlled access right-of-way based on a state law that requires consideration of controlled access highways in electric transmission route planning. If the transmission line can be located adjacent to the security fence on the DOT right-of-way, it eliminates the need to clear a separate corridor for the trans-

mission line, which minimizes environmental impacts. Wisconsin also charges longitudinal occupation fees to the electric transmission utilities whether its poles are physically on the controlled access right-of-way or its lines occupy the airspace over it, since the utility must maintain electrical safety code clearances that prevent Wisconsin from complete use of that portion of the right-of-way.

Another best practice is the establishment of a utility corridor, which often requires that the DOT move the denial of access line or security fence inward from the right-of-way line. However, these are only useful if the controlled access facility has frontage roads that can be used for maintenance of the utility facilities. States such as Georgia that have few frontage roads also have few utility corridors. Texas, which has many frontage roads, also uses so-called "utility access denial lines." According to the utility accommodation rules in Texas, the DOT may establish a utility strip on controlled access right-of-way if an installation is requested by a public utility, the facility can be serviced from the frontage road, and other conditions of the rules are met (*4*). The Texas DOT does not move the access denial line, which is concurrent with the right-of-way line, but rather places a utility access denial line between the proposed utility facility location and the highway mainlanes and connecting ramps. An advantage of this practice is that denial of access regarding property adjoining the right-of-way line is not altered.

The Georgia DOT mentioned a special situation for existing highways that are converted to controlled access facilities. These highways might have a limited number of driveways to serve property along the road and utility facilities to serve residences and businesses. Depending on specific circumstances, these utilities and service lines are adjusted as necessary to eliminate utility conflicts but might be allowed to relocate within the right-of-way. New or additional utility facilities along these routes will usually not be allowed or will require approval by the state utilities engineer. Wherever practical, all new utility installations in Georgia must be located outside the right-of-way or beyond the limit of access.

Other best practices that DOTs mentioned included the following:

- Reach out to subject matter experts within the DOT on a project-by-project basis.
- Start coordination with utility owners and identify the need for utility accommodation and/or utility corridors early in the design process, once design is 30% complete.
- When using utility corridors, help utility owners agree on the size and location of utility facilities within the corridor.

Question 10 – Additional Contact for Best Practices

Is there anyone else at your agency we should contact for additional information regarding best practices for managing longitudinal utility installations on controlled access right-of-way?

Survey respondents provided contact information for 11 individuals with additional information about best practices. It was noted that several of these individuals actually participated in the survey. The study team contacted all other individuals to learn more about best practices for longitudinal utility installations on controlled access right-of-way.

Question 11 – Utility Management by Local or Municipal Agencies

Are you aware of a local or municipal agency that has a utility management practice that may be of interest to this study?

The study team was interested to learn from DOT representatives about any local or municipal agencies with utility management practices that would be of interest to this study. The study team received 38 responses, all of which said that the DOT representative was not aware of such a management practice.

References

1. "Missouri Engineering Policy Guide," Missouri Department of Transportation, Jefferson City, 2013 [Online]. Available: http://epg.modot.org/index.php?title=Main_Page [accessed May 3, 2013].
2. "Utility Accommodation," New Jersey Administrative Code 16:25-7A.3 [Online]. Available: http://www.lexisnexis.com/hottopics/njcode/ [accessed May 3, 2013].
3. "Utility Accommodations," Wyoming Administrative Code [Online]. Available: http://soswy.state.wy.us/rules/ [accessed May 3, 2013].
4. "Utility Accommodation," 43 TAC 21.37 [Online]. Available: http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=43&pt=1&ch=21&rl=37 [accessed May 3, 2013].

APPENDIX C

Survey Responses

This appendix contains responses by survey participants that provide useful information for readers but were too lengthy to include in the main body of the report. Personally identifiable information from responses was removed where appropriate.

Question 2 – Management of Longitudinal Utility Installations on Controlled Access Right-of-Way

Question 2.1 – Documents Describing Agency Management Procedures

Please check the name (and if possible, provide the web address) of the document(s), state statute(s), or other that describes your agency's procedure(s) or process(es) for managing longitudinal utility installations on controlled access right-of-way.

Question 2.1 was dependent on a "yes" answer to question 2. Listed below are responses from states that answered "yes" to question 2 and their responses to question 2.1. In some cases, respondents checked a type of document but did not provide a name or web address for the document. An attempt was made to locate the appropriate file and added web addresses to Table C1 as feasible. An "X" in a box signifies that the state selected the type of document but did not provide a name or web address, and a web address was not found for that document.

Question 3 – Utility Owner Input into Development of Management Procedures

How much input do utility owners have in developing procedures or processes for managing utilities on controlled access right-of-way?

The following are responses received to question 3. Duplicate responses (e.g., "None") are listed only once.

- 1. Owner name. 2. Location (longitude and latitude). 3. Brief description regarding installation method. 4. Plan and drawing. 5. Traffic plan if applicable. 6. Utility information.
- A lot. When developing policy, the DOT gives utilities and utility associations the opportunity to comment and propose revisions. The DOT also encourages utilities to suggest changes regarding our policies. The DOT also works with utilities on a permit by permit basis if there is a procedure or process that should be utilized.
- Administrative rules are sent to utility owners and open for public comments prior to adoption. Semi-annual meetings are held for all utilities state-wide to coordinate with DOT and discuss issues. Monthly utility coordination meetings are held with major private utility companies.
- At this time we are reviewing all of our manuals and policies and therefore, reaching out to the utilities for input. At this time, we do not allow utilities inside of the access control; we are not planning a change.
- During the development of the UAM utility companies were sent a copy to review and comment. The utilities have a committee called Utilities Coordinating Council (UCC).
- Industry input is part of all policy development.
- Just through adopting the accommodation policy when filing for administrative rules.
- Limited, as our policies are tied to state and federal regulations.
- Limited. During public comment of administrative code revisions. Through legislative lobbying.
- Little.
- Little. DOT develops procedures and processes for managing utilities on controlled access roads.
- N/A.
- None.
- None at this time.
- None except by going to the legislators.
- Not much, but we are always willing to listen. We try our best to limit the placement of utilities within a controlled access highway. The exception is telecommunications, which we do allow longitudinal installation.
- Not very much.
- Promulgated rules and regulations.
- Recommendations during rule making.
- Some.
- Some input at annual Utility Functional Council meetings.

TABLE C1

NAMES AND WEB ADDRESSES OF DOCUMENTS DESCRIBING AGENCY PROCEDURES FOR MANAGING LONGITUDINAL UTILITY INSTALLATIONS ON CONTROLLED ACCESS RIGHT-OF-WAY

State	State Utility Manual	State Permitting Manual	State Utility Accommodation Rule/Policy	Other
AK	State of Alaska DOT&PF Utilities Manual 5th Edition (AKUM5)		Alaska Administrative Code 17 AAC 15 http://www.legis.state.ak.us/basis/folioproxy.asp?url=http://wwwjnu01.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=[JUMP:'Title17Chap15']/doc/{@1}?firsthit	
AR			http://www.arkansashighways.com/right_of_way_division/UtilityAccomodationPolicy.pdf	
AZ	X	X	X	
CA	http://www.dot.ca.gov/hq/row/rowman/manual/index.htm	http://www.dot.ca.gov/hq/traffops/developserv/permits/encroachment_permits_manual/index.html		
CO	http://www.coloradodot.info/library		http://www.coloradodot.info/library	
CT	http://www.ct.gov/dot/lib/dot/documents/dutilities/ACCOMODATION.pdf			
DE	http://deldot.gov/information/business/drc/manuals/utilities_manual_2008_may_5.pdf			
FL	http://www2.dot.state.fl.us/proceduraldocuments/procedures/bin/710020001/710020001.pdf		https://www.flrules.org/gateway/ruleNo.asp?id=14-46.001	
GA			http://www.dot.ga.gov/doingbusiness/utilities/Documents/2009_UAM.pdf	
IA			http://www.iowadot.gov/traffic/pdfs/UtilityPolicy.pdf	
IN			http://www.in.gov/indot/2389.htm	
KS			http://www.ksdot.org/burconsmain/connections/uap2007.pdf	
LA	http://doa.louisiana.gov/osr/lac/books.htm	http://doa.louisiana.gov/osr/lac/books.htm	http://doa.louisiana.gov/osr/lac/books.htm	
MA				Job specific issue. Current State Utility Manual does not allow longitudinal utility corridors on controlled access roads.
MD	http://sha.md.gov/OOC/Utility_Policy.pdf		http://sha.md.gov/OOC/Utility_Policy.pdf	
MI			http://www.michigan.gov/mdot/0,1607,7-151-9623_26662_26679_27267_48606-182179--,00.html	Public Act 368 of 1925
MN	http://www.dot.state.mn.us/utility/files/pdf/policy/utilities-manual-web.pdf	http://www.dot.state.mn.us/utility/files/pdf/policy/utilities-manual-web.pdf	X	
MO				Engineering Policy Guide
NC	https://connect.ncdot.gov/projects/Roadway/RoadwayDesignAdministrativeDocuments/Accomodating%20Utilities%20on%20Highway%20Rights%20of%20Way.pdf		X	Encroachment Form: (R/W 16.2) Form used for utilities requesting installation of facilities within C/A, N.C.G.S 62-180: Statute allowing public utilities to use public R/W., N.C.G.S 136-19.5: Statute giving authority for the NCDOT to purchase permanent utility easements in relocating utilities on highway projects.

Table Continued on p.50

State	State Utility Manual	State Permitting Manual	State Utility Accommodation Rule/Policy	Other
ND	http://www.dot.nd.gov/divisions/design/utilitypermits.htm	http://www.dot.nd.gov/divisions/design/utilitypermits.htm	http://www.dot.nd.gov/divisions/design/utilitypermits.htm	
NE	X		www.transportation.nebraska.gov/projdev/docs/utilaccom.pdf	
NH	http://www.nh.gov/dot/org/projectdevelopment/highwaydesign/documents/UAM_complete.pdf			
NJ		New Jersey Administrative Code (N.J.A.C.) 16:41 Highway Occupancy Permit	New Jersey Administrative Code (N.J.A.C.) 16:25 Utility Accommodation Policy	
NV	X	X	We have adopted the AASHTO Accommodation policy.	
OH	http://www.dot.state.oh.us/Divisions/ProdMgt/RealEstate	http://www.dot.state.oh.us/Divisions/ProdMgt/RealEstate	http://www.dot.state.oh.us/Divisions/ProdMgt/RealEstate	
OK			Copy available upon request.	ARSD 70:04:05
OR	X		http://arcweb.sos.state.or.us/pages/rules/oars_700/oar_734/734_055.html	AASHTO Policy
PA	ftp://ftp.dot.state.pa.us/public/PubsForms/Publications/PUB%2016M/COVER.pdf	ftp://ftp.dot.state.pa.us/public/Bureaus/BOMO/MC/Publication282.pdf	http://www.pacode.com/secure/data/067/chapter459/chap459toc.html	
SC			http://www.scdot.org/doing/permits_Utility.aspx	
SD			http://legis.state.sd.us/statutes/DisplayStatute.aspx?Statute=31-26&Type=Statute http://legis.state.sd.us/rules/DisplayRule.aspx?Rule=70:04:05 http://legis.state.sd.us/rules/DisplayRule.aspx?Rule=70:04:05.01	
SD			X	ARSD 70:04:05
TN			http://tennessee.gov/sos/rules/1680/1680-06/1680-06-01.pdf	
TX	http://onlinemanuals.txdot.gov/txdotmanuals/utl/utl.pdf	http://onlinemanuals.txdot.gov/txdotmanuals/use/use.pdf	http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=43&pt=1&ch=21&sch=C&rl=Y	
UT	http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:3834	http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:203	http://www.rules.utah.gov/publicat/code/r930/r930-007.htm	http://www.rules.utah.gov/publicat/code/r907/r907-064.htm
VA	http://www.virginiadot.org/business/row-default.asp	Virginia Administrative Code 24 VAC 30-151	Accommodation and permits in same VAC	
VT	Hardcopy only.	Hardcopy only.	http://vtransengineering.vermont.gov/sections/right_of_way/utilities_and_permits	Access management guidelines: http://vtransengineering.vermont.gov/sections/right_of_way/utilities_and_permits
WA	http://www.wsdot.wa.gov/publications/manuals/fulltext/m22-87/Utilities.pdf	Contained in the utility manual.	http://www.wsdot.wa.gov/publications/manuals/fulltext/M22-86/UtilitiesAccommodationPolicy.pdf	
WI			http://www.dot.state.wi.us/business/rules/property-uap.htm	
WV			http://www.transportation.wv.gov/highways/engineering/files/ACCOMMODATION_OF_UTILITIES.pdf	
WY	http://www.dot.state.wy.us/home/administration/rules_regs/Utility_Accommodations_Section.html	X	X	Utility Relocation assistance Wyoming State Statute 24-13-101 to 24-13-104 Chapter 24 & 28 WYDOT Rules & Regulations

- Submittal of plans, encroachment permit, traffic control, access from points other than interstate, schedule, etc. for review and approval by both the DOT and FHWA local office.
- The Administrative Process Act provides for input as policy or policy revisions are processed.
- The administrative rule and the incorporated manual are developed under state laws which require these to be developed in the public and allow any affected person or company the right to participate in the development and the right to challenge any requirement.
- The department is open to utility owners' input and ideas. Utility owners are involved with the committee that updates policy and procedures for managing utilities.
- The Utility Accommodation Policy (UAP) is up for re-adoption every five years. During the development of the new UAP, utility companies also participate with their review and comments.
- They are given an opportunity to provide comments when the utility manual is being updated and is posted for public comments. Our utility manual is currently being updated and will be out for comments in April.
- They can request whatever they believe they need, but all is subject to department and FHWA approval.
- The utility owners have little input on changing a state highway law.
- Utilities had input in the policy language, specifically our Point 25 process in the state code and therefore the policy. They agreed to the times for communication, plan submittals, and penalties for non-performance. On a day to day basis they have little input in developing processes or procedures.
- Utility owners can submit concerns, opinions, and beliefs at any time. When these are submitted, the DOT reviews them to determine if they will work with our mission.
- Utility owners have a chance to provide comments at annual utility meetings, utility owner focus groups and training sessions, and at other times directly to the utilities engineer.
- Very little.
- Very little input on current manual and procedures. The DOT is currently developing a new policy and procedure manual for accommodating utilities on highway rights of way. We are reaching out to our stakeholders including the utility industry for their input.
- Very little on a controlled access right of way that is already constructed. However during the reconstruction of a controlled access highway, all utility owners are involved in the design process. The utility owner is directed to maintenance/management of their facilities via the utility permit.
- Very little, that policy is written by the DOT; however, we do ask for input from all utilities.
- We always try to negotiate with utility owners during a project; however, on controlled access corridors, we have the ultimate decision.
- We don't allow longitudinal placement of utilities on controlled access right-of-way. Utilities are only allowed to cross the right-of-way. Their input is not solicited. There has been some dialogue on the requirement for encasement for highway crossings.
- Zero.

Question 4 – Problems with Management of Longitudinal Utility Installations on Controlled Access Right-of-Way

What are the main problems that your agency encounters with the management of longitudinal utility installations on controlled access right-of-way?

Question 4.1 – Longitudinal Utility Installations on Controlled Access Right-of-Way Outside of Project Development

What are the main problems that your agency encounters with the management of longitudinal utility installations on controlled access right-of-way during permitted installations and operations (outside of project development)?

The following are responses received to question 4.1. Duplicate responses (e.g., "None") are listed only once.

- (1) Proper work zone traffic control. (2) Ensuring that the permitted operation does not adversely affect traffic during peak hour conditions. We have had to force some utility work to 7 p.m.–5 a.m. (3) Making sure the utility performs proper environmental investigations. (4) Proper erosion control and restoration. (5) Removal of trees and other vegetation used for snow control. (6) Trying to keep the utility access from private property and not the highway shoulder. (7) Obtaining compensation for release of scenic easement rights and more specifically, how to appraise the value of those rights that are affected.
- (1) Pole mitigation for poles in the control zone that have had a history of collisions. (2) Franchise renewal or consolidation for expired franchises.

- 1. The owner openly requests a use of entrance or exit of installation within controlled access. 2. Installation of excavation. 3. Transmission utility line with high pressure or high potential risk. 4. Previous approval for longitudinal installation conflicting with incumbent rule.
- Actual installation location not being where permitted. Lack of proper landscape repair. Lack of as-built drawings. Accessing work location from the roadway. Not using proper traffic control.
- As per state UAP, "installation, repair or maintenance shall not be achieved from highway ramps or roadways, but from local roads or points outside of the limited access highway's control access line." Utility companies have to submit plans as a part of their permit application and get approval from the department's traffic operations for lane closure hours.
- Companies keeping their contact info up to date—when companies sell their facilities, they do not always let us know. Companies not providing enough information in their permit—hard to locate the facility in the future.
- Complaints from utility companies on how long it takes to get an encroachment permit. The permit is reviewed internally by all divisions.
- Completing installations in a timely manner.
- Ensuring that all of the requirements are included in the permit application.
- Few longitudinal installations are approved and no insurmountable problems have been encountered to date.
- Getting utilities to place utilities where they are permitted.
- Keeping other utilities out.
- Longitudinal utility installations on full controlled access right-of-way are limited by promulgated rules to fiber optic. To date we have yet to make a longitudinal installation under provision of these rules.
- N/A.
- None.
- None. We don't allow them in controlled access.
- Obtaining sufficient information from utility to accurately locate proposed location of facilities educating district staff in requirements for longitudinal facilities.
- Only telecommunication facilities are permitted on controlled access right-of-way. The state has very little experience in this arena.
- Our main concern is that the utility does not comply with the requirements of the utility accommodation manual.
- Political pressure to allow longitudinal utilities in the right of way along limited access corridors. Most utilities know the policy and stay clear; [sometimes] local governments want to use these areas for economic reasons.
- Restoration of right of way.
- Safety concerns during installations. Not following location or bury depths.
- Safety of traveling public, delay to traveling public, compromise to road level of service during maintenance.
- So far, we have not encountered any serious problems worth noting.
- Staying in designated corridors.
- The DOT currently does permit longitudinal utility installations on controlled access with the exception of servicing our facilities are under extreme hardship. Under no circumstances will the DOT allow service taps from within the controlled access right-of-way to a private facility.
- The prevailing challenges with longitudinal utility installations are divided into tactical and strategic categories as follows: Tactical: 1. Where are they located? 2. Who owns them? 3. How much relative space is available? Strategic: 1. How do we maximize access in finite space with ever-increasing demand? 2. How do we minimize future project costs associated with any necessary relocation activity? 3. How do we ensure equitable access? 4. How do we secure the necessary resource funding to remove the tactical challenges and focus on the strategic challenges? We can answer the tactical challenges today, but not without a significant manual time investment to retrieve fragmented data across multiple systems. Even then, we only wind up with snapshots of a particular area of interest, and being able to see the entire system, or network, in a dynamic, visual, and real-time environment remains elusive. In my experience, being able to visualize an entire system is a fundamental necessity for developing responsible solutions to the more strategic challenges. In the final analysis, we seem to be caught in a bit of a recurring cycle. Funding advanced GIS-based systems would lay the groundwork for significant future cost savings, but being able to convince an organization to pay now and save later generally takes years of sustained effort to achieve. This is particularly true when the cost savings are difficult to quantify in advance and when the change process may result in the perception of winners or losers.
- This is typically not allowed unless an exception is approved. Ensuring that proper traffic control is provided in installing and maintaining the utility facility.
- Traffic control, however longitudinal placement of utilities is rare within controlled access highways.
- Utilities are prohibited from using controlled access right of way and must apply for a variance to this prohibition through a process established by state law. There is no real problem with this arrangement.
- Utilities attempting to access facilities from main lane or crossing access denial line/right-of-way line.

- Utility companies accidentally remove our right-of-way highway markers during construction. Sometimes traffic control is an issue. Making sure the utilities are installed where they were shown on the plans is an issue. Obtaining as-built plans is difficult after construction.
- The DOT has very little longitudinal utilities within controlled access highways. Any permitted installations would be subject to a highway work permit which would require construction oversight by either maintenance operations or our construction section.
- We do not allow longitudinal utility installation on controlled access.
- We don't allow them generally, but on occasion we are asked to approve exceptions to the policy, the request is first approved by the district staff then forwarded for a final approval by the director of utilities.
- We have very limited longitudinal installations on controlled access right-of-way. We will utilize a permit and/or lease. Valuation of the rights and location are the two main issues.
- We only allow utilities to install within the right-of-way if they are located outside the denial of access line and are able to access their facilities from a frontage road. As result during the installation and maintenance we do not experience major problems since they are not allowed to affect the traffic located in the controlled right-of-way.
- With the exception of fiber optic cable, no longitudinal installations are allowed inside the controlled access right-of-way. However, the DOT has encountered problems with overhanging (into the right-of-way) electrical transmission facilities. In some cases the overhanging facility was allowed to encroach the right-of-way as the impact would have been greater to the agricultural activities outside the right-of-way. While the resolution of the overhanging problem is approved at the state level by meeting the requirements of statutory law, the resistance to approval is not as easily understood at the federal level and has caused lengthy delays in the permitting process.

Question 4.2 - Longitudinal Utility Installations on Controlled Access Right-of-Way During Project Development

What are the main problems that your agency encounters with the management of longitudinal utility installations on controlled access right-of-way during project development/project delivery?

The following are responses received to question 4.2. Duplicate responses (e.g., "None") are listed only once.

- (1) Designing around the facility (once an electric transmission or fiber optic line is on the right-of-way, you don't want to move it). (2) If we obtained compensation for allowing a utility to longitudinally occupy a controlled-access highway and we have to relocate them off the right-of-way, then we need to calculate a prorated share of that compensation and pay it back to the utility.
- 1. Traffic delay. 2. Impact on existing transportation structure.
- Conflicts with utilities and the coordination of relocates.
- Coordination efforts are typically difficult especially when we have conflicts.
- Coordinating the relocation in a timely manner, not that common. Delays getting utility plans for relocation returned. Lack of as-built drawings.
- Few longitudinal installations are approved and no insurmountable problems have been encountered to date.
- Getting facilities moved prior to a project going to contract ensuring facilities are located accurately in our plans.
- Getting permitted facilities to move.
- Getting the as-built plans from the project that show where the utility has been located and where DOT facilities are at the end of a project. It is one of the items that just gets forgotten. They may get delivered from the contractor but then misplaced by the project and I end up chasing them down or going back to the project location and creating the as-built plans ourselves. If I do not get the conduits mapped correctly I cannot get them populated with other companies or get them located by our own crews. The DOT has not had many problems with the telecommunication companies installing during our projects. They actually do a better job because they have better oversight of their installations.
- Getting the utility to relocate prior to a project going to ad... or more probably the issues of who is responsible for removing a pole that is in joint use when original owner has moved and the secondary occupant moves last.
- Having the authority to purchase permanent utility easements during the right-of-way acquisition phase has significantly reduced our challenges in meeting project delivery schedules. Our main challenge is not being able to purchase danger tree rights in relocating power transmission lines. Again, this is strictly for relocating lines outside of the control corridor and/or crossings only.
- Identifying location of all utilities.
- Maintaining project schedule by clearing utilities where needed.
- Minimal impact as the utility is there by permit.
- Must clear the project as designed by DOT engineers.

- N/A.
- N/A for me—this is a district function, not a HQ function.
- None. We don't allow them in controlled access.
- No problems encountered during project development/project delivery, as the utility owners are included in all aspects of the project development, etc.
- No space for utilities to relocate to.
- Once a variance is obtained, they are permitted—like any other utility—on our other right of ways.
- Only low voltage telecommunication corridors have been allowed. Main problems are potential conflicts with future roadway improvements.
- Only telecommunication facilities are permitted on controlled access right-of-way. The state has very little experience in this arena.
- Our main concern is that the utility does not comply with the requirements of the Utility Accommodation Manual.
- Relocating facilities in order to not adversely impact project schedules.
- Relocation, reviewing feasible alternatives. Cost of relocation.
- Same issue. Political pressure to allow utilities longitudinal in the right of way along limited access corridors. Most utilities know the policy and stay clear; it's when local governments want to use these areas for economic reasons.
- See note above. Longitudinal installations on full control access are restricted, therefore there are no problems with public utility installations.
- Some projects may require the utility to relocate in order to accommodate the project. To date, these have been coordinated early with the utility and have gone smoothly.
- The main problem would be utility adjustments done in a timely manner to avoid a construction claim by the general contractor.
- The major issue is ensuring that the utility will be located outside the denial of access and can service their facilities without using the controlled access highway.
- Time frame to allow for required utility relocations. Lack of responsiveness of utility owners.
- Utilities attempting to dictate the terms to gain access to facilities from main lane or including crossing access denial line/right of way line in their plans. Additionally not providing access and traffic control plans for the maintenance of the facility
- We avoid this whenever possible; it must make business sense to us to allow a utility to remain in limited access right-of-way or to relocate.
- We do not allow longitudinal utility installation on controlled access.
- We try to identify any conflicts (depth, size, cover, pending roadway improvements) during the analysis phases of the design, and try to work around any existing installations. We may seek to have the installation removed during the project, depending on potential conflicts.
- When allowed, the facility is typically installed while roadway construction is occurring, so the coordination with the construction contractor can present the main issues.
- Working out agreements, terms, and costs. Meeting scheduled completion dates.

Question 5 – Unpublished Procedures and Processes to Manage Longitudinal Utility Installations on Controlled Access Right-of-Way

Question 5.1 – Description of Process

Please describe the procedure or process your agency uses to manage longitudinal utility installations on controlled access right-of-way.

Question 5.1 was dependent on a "yes" answer to question 5. The following are responses from states that answered "yes" to question 5, and their responses to question 5.1.

- Procedures are in the policy. Process includes forms and reviews that have regional influence (i.e., more restrictive work schedules in urban area).
- The utility permit specifies that the utility owner must coordinate the installation with the district permit officer.
- Varies on a case by case basis; few longitudinal installations are approved.
- We like them to place within 15 ft of the right of way lines.
- We try to get them to share trenches and/or conduit but that is rarely successful.
- The DOT works directly with the Public Service Commission (PSC) on all electric transmission projects beginning prior to the public information process through draft EIS, final EIS, public hearings, and final decision to make sure the DOT's input is fully accounted for since the project may or may not be able to be accommodated on our controlled-access highway right-

of-way both now and with any future highway improvement projects. Our working with the PSC also includes the design, permitting, and construction processes as needed.

Question 5.2.1 – Description of Rural vs. Urban Process Differences

Please describe differences between managing longitudinal utility installations on controlled access right-of-way in rural and urban locations.

Question 5.2.1 was dependent on a "yes" answer to question 5.2. The following are responses from states that answered "yes" to question 5.2, and their responses to question 5.2.1.

- (1) Since one of the criteria used to develop our per-mile longitudinal utility fees is AADT, the fee is typically higher in an urban area. (2) We require more of the work performed overnight in urban areas rather than during the day also due to traffic volume—especially when a lane or shoulder closure is needed. (3) There is less space for utility installations in urban areas and they may run into other obstacles such as retaining walls, sound barriers, and bridge abutments. (4) Right-of-way access is needed more often from the highway shoulder in urban areas than rural areas.
- Restricted work times in urban areas.

Question 6 – Involvement of Utility Owners in Determining the Location for Utility Facilities

Question 6.1 – Description of Process

Please list the step-by-step process by which utility owners propose the location where they are permitted to install their facilities.

Question 6.1 was dependent on a "yes" answer to question 6. The following are responses from states that answered "yes" to question 6, and their responses to question 6.1.

- 1. Submit permit application with desired location of facility (including showing any other facilities in the area). 2. Review facility location with district office. 3. Move line as necessary to fit within the right-of-way.
- As noted in state code, the owner of a utility shall submit a utility permit application to the applicable area engineer for the installation, relocation and expansion of utility facilities on a state highway within the right of way.
- Application and plan are submitted. Permitting section contacts owner if there are issues with the proposal. Permit is approved or rejected.
- Fill out and submit permit application with sketches of proposed location for their facility as described in the Utilities Manual.
- HOP [highway occupancy permit] application process (ePermitting).
- I have only been the ROW manager for 1.5 months so I am guessing. From what I've seen, utility owners call the district when they become aware of the project and begin negotiating in person.
- List location in permit application. Show location on plans. Review.
- Most occupancy on controlled access is through resource sharing. Utility proposes corridor, corridor evaluated for DOT needs. Locate in outer ROW limits unless terrain issues. Submit preliminary plans, site review, submit final plans.
- On roadway projects, utility companies provide plans for their proposed relocations for review. Conflicts/concerns will be identified. By policy, utilities are not allowed on controlled access right-of-way.
- Owners may submit a proposed location for installation to be reviewed by the utility section and design engineer. The DOT will make the final determination.
- Permit applicants may propose any location and may request a meeting to discuss the location.
- Proposed location shown in the utility installation request.
- Provide corridor location—reviewed by Shared Resource Committee. If approved, submit detailed plans—reviewed by District Engineer, Utility Section, and Shared Resource Committee. If approved, Shared Resource Committee will advise the ROW Division when to issue the permit.
- See the permitting process information on the DOT website.
- Send resource sharing proposal to DOT plan and site review. Contract negotiation. Board of Public Works review and approval.
- Send their plan to Permits and it is routed through the various divisions for comment. Can take a while. Not sure how long but takes several months.
- Submission of a proposal and execution of an agreement for department use of facilities.

- Submit proposed corridor plan for review to the Shared Resource Committee. If approved, submit detailed proposed plans. These plans are reviewed by the District Engineer, Utility Section, and the Shared Resource Committee. Upon approval the Shared Resource Committee will advise the Utility Section when to issue the permit.
- The utility owner prints off a copy of the utility permit from the DOT's website and completes the form along with a map showing the proposed location of the utility installation. The permit is reviewed/approved at the department's area office and is then passed on to the appropriate regional office for final approval.
- The utility process is currently being developed and is in the final phase. The step-by-step process establishes all the major activities required to be done by the designer of the project, utility owner and the department, from problem screening, concept development, and preliminary engineering, to the final design and construction phases of the project.
- The utility proposes the location during the permit application process or in response to requests for information if it is related to a DOT project. There may be meetings in the field to field review or office meetings to discuss concerns and what are acceptable revisions or redesign needs. These are typically done at the district level with the district utility coordinators. If compensation is required the central office gets involved. This proposed location is usually rejected or accepted based on the initial proposal. The utilities know the policy and they design to comply.
- The utility submits the permit application and plans for their proposed facilities to the department. The department reviews the submission to ensure that they will comply with our Utility Accommodation Manual. Upon the department's approval, the utility submission will be reviewed and approved by the FHWA.
- The utility will contact the DOT regarding the possibility of occupying or entering into the right-of-way. We will review their request and see if such a possibility exists. If there are no current or projected conflicts with our system, we will then ask for detailed drawings and specs, and comment and/or approve. If it is a lateral crossing, then we issue a permit, free of charge. Our permit will contain restrictions on what is permitted and what is not. These are revocable permits, with no reimbursements to the utility if it is required to move or alter its installation within our right-of-way. If it is longitudinal installation, it will be by lease, with set terms and conditions. If there is a need for removal or alteration of the installation, then there is a clause to allow us to order the removal of the installation, and no reimbursement is due to the utility.
- The utility would be notified of our accommodation policy regarding longitudinal use of the limited access right of way.
- They apply for a permit from our technical services staff, if that is an exception to the policy. The district makes a recommendation to the Director for final/official approval.
- They need to send in detailed plans and attach them to the permit to be approved.
- They submit a detailed plan that complies with our accommodating policies.
- They submit a location with their drawings that are part of the permit application. The DOT makes adjustments to that location as needed before permit approval. With electric transmission line installations, there are numerous meetings with the utility involved. The Public Service Commission determines a final corridor, and the DOT works with the utility on a final design alignment.
- This is done through the permitting process, but we do not allow cutting of the pavement. We expect the permittee to propose the location, which may need to be changed depending on what improvements are in the right-of-way.
- Utilities submit a permit application form with a plan proposing their desired location. Sometimes the utilities are required to mark the location on site as well.
- Utilities understand that they are prohibited by law from placing facilities within these rights of way. So, they generally come to the local permitting office to plead their case, hoping the maintenance office will go ahead and give them a permit without going through the legislated process. However, our permitting offices are good at knowing that cannot be permitted without a variance, and they instruct the utility to apply for the variance. The utility would then state the reason why using the controlled access is the only practicable means of providing their services. If the variance is denied, end of story; if the variance is approved, the utility is sent back to the permitting office with the approval in hand. The permitting office will now have the go-ahead to permit the utility as it would any other utility.
- Utility owners submit a proposed location and we either approve or disapprove. We strive to locate utilities 5 ft from the right-of-way line.
- Utility submits permit application with proposed installation plans for review and comment by the department permitting staff. Generally if it is an infrastructure build, we recommend a face to face meeting prior to the preparation of plans to specifically address the longitudinal installation on controlled access roadways, as well as the general process and pitfalls we have identified.
- When the utility owner submits the application for construction and occupation, it proposes the location. The regional office reviews the proposal and responds to the utility as to whether it is acceptable or not based on the type of highway, scenic classification, and maintenance aspects for both the utility and the department.

Question 7 – DOT Use of Utility Corridors

Question 7.1 – Alternative Definitions of Utility Corridor

Please provide your definition of a utility corridor, if different from our definition given above.

Question 7.1 was dependent on a "yes" answer to question 7. The following are responses from states that answered "yes" to question 7, and their responses to question 7.1. Indiana did not answer question 7 but provided a response to question 7.1. Pennsylvania answered "yes" to question 7, but the response indicated that Pennsylvania does not use utility corridors on controlled access right-of-way.

- Utility strip—the area of land established within a control of access highway, located longitudinally within the area between the outer traveled way and the right of way line, for the nonexclusive use, occupancy, and access by one or more authorized public utilities.
- A corridor location in the outer limits of ROW is desired but is often changed due to physical limits.
- An easement other than right-of-way for multiple utilities to occupy.
- Generalized corridor: as close to the right-of-way line as possible, not underneath pavement, not in medians, access points to be located outside of N/A lines.
- If the design permits, we will try to acquire additional right-of-way to allow for the relocation of the utilities. This is dependent upon the available areas within the project corridor.
- N/A.
- On interstate highway we only allow crossing, no longitudinal utilities within the right-of-way.
- Same.
- The definition above is correct, but the areas are limited to areas where frontage roads are located.
- The definition is the same as above. The utility corridor is created by an inward relocation of the limited access line a minimum distance to the extent necessary to permit installation of the utility facility between the relocated limited access line and the existing freeway right-of-way line.
- We would designate an area outside of LARW [limited-access-right-of-way] fence but within ROW to allow placement of facilities. These areas are not deemed to be in an area to jeopardize our traffic movement during any maintenance operations.

Question 7.2 –Use of Utility Corridors

Does your agency use utility corridors for transverse crossings, longitudinal installations, or both?

Question 7.2 was dependent on a "yes" answer to question 7. Listed in Table C2 are responses from states that responded "yes" to question 7 and their responses to question 7.2. In addition, Indiana did not answer question 7 but provided a response to question 7.2.

TABLE C2 LONGITUDINAL INSTALLATIONS

AR	Longitudinal installations
CA	Longitudinal installations
GA	Longitudinal installations
IA	Longitudinal installations
ID	Transverse crossings
IN	-*
ND	Both
NJ	Both
OH	Both
PA	-*
SD	Longitudinal installations
TX	Longitudinal installations
UT	Both
VA	Longitudinal installations
VT	Both
WA	Both

*Indiana and Pennsylvania responded "Longitudinal installations," but provided that these utility corridors are located outside of controlled access right-of-way.

Question 7.3 – Scenarios for Utility Corridor Use

Under which circumstances or specific scenarios does your agency make use of utility corridors on controlled access right-of-way?

Question 7.3 was dependent on a "yes" answer to question 7. The following are responses from states that answered "yes" to question 7, and their responses to question 7.3.

- 1) When a specific request is made by a utility owner, the Department will consider. 2) When the utility is needed for a department facility.
- Again, this is a regional decision—usually dependent on whether it is work on a project. Most project offices support joint trenching for construction projects. In accommodations or situations where more than one utility is going to, say, service a development, they are encouraged to work together to install—the advantage being that less of the right of way is impacted and the likelihood of damage by one utility to the other is lessened.
- As an exception to the accommodation rules that is requested by the utility.
- If available, we will acquire additional right-of-way to help in locating the required relocation areas. This helps when we are working in a rural area and/or on a project where project timelines will not allow for delays in the acquisition of the required right-of-way for the relocated utilities.
- If there are multiple utilities with eligible reimbursable relocation costs. Landowners who are known to make it difficult for utilities to acquire their own easements. No space in the proposed right-of-way. Or all of the above.
- If they have no other locations to put their utilities then we will allow utilities within the right of way on Interstate systems.
- In areas along frontage roads. These are very limited.
- Longitudinal installations are permitted on state highways but typically are not allowed on freeways where access is controlled. There are exceptions. Exceptions are review by HQ. There is a specific Engineering Group that reviews exceptions to the policy of no longitudinal installations in the freeway right of way.
- Not sure—sorry!
- Our corridors are guidelines to locate at the outer edge of the right-of-way, not really corridors. They are always in effect. If significant space constraints exist, then they may be forced to share trench or conduit. Our policy requires freeway and interstate installations to be multiduct, but that is rarely done.
- Project specific constraints may require joint occupancy in trenches or on poles.
- The conditions are stated in the utility accommodation policy.
- Unknown.
- We don't have utility corridors on controlled access right-of-way. We have corridors in free access right-of-way that run parallel to controlled access right-of-way when the utility assures there are no locations where it is feasible to accommodate its facilities on frontage roads or adjacent public roads or streets. The utility must also provide engineering and economic justification.
- We encourage the development of a corridor on added capacity projects to lower the impact of additional utility easements and provide a quicker relocation plan.
- Whenever possible.
- When several existing utilities are impacted by the controlled access facility and it is in the best interest of the project and the landowner/taxpayer that a utility corridor be provided to not only allow a space for the impacted utility, but to also help in relocating the affected utilities prior to the construction of the project.

Question 8 – Accommodation of Renewable Energy Sources

Does your state have a policy to accommodate infrastructure that supports renewable energy sources (also characterized as utilities) on controlled access right-of-way as noted in FHWA's "Guidance on Utilization of Highway Right-of-Way"? (For more information see http://www.fhwa.dot.gov/realestate/guidutil_a.htm.)

Question 8.1 – Name and Web Address of Renewable Energy Accommodation Policy

Please provide the name (and web address, if possible) of the document(s) that describes your agency's policy to accommodate infrastructure that supports renewable energy sources on controlled access right-of-way.

Question 8.1 was dependent on a "yes" answer to question 8. The following are responses from states that answered "yes" to question 8, and their responses to question 8.1.

- Utility Accommodation Regulation. http://www.dot.state.wy.us/files/content/sites/wydot/files/shared/Highway_Development/Utilities/WYDOT%20Utility%20Accommodation%20Regulations_Jan%202013.pdf
- We are in the process of documenting our accommodation policy for renewable energy sources on highway right of way.

Question 9 – Best Practices for Managing Longitudinal Utility Installations on Controlled Access Right-of-Way

Is there a procedure or process that your agency uses to manage longitudinal utility installations on controlled access right-of-way that you would consider a best practice?

Question 9.1 – Description of Best Practice

Please describe the best practice.

Question 9.1 was dependent on a "yes" answer to question 9. The following are responses from states that answered "yes" to question 9, and their responses to question 9.1.

- 1) Shared Resource Committee serving as the central management and controlling entity. 2) Requirement for district permit officer and/or district engineer oversight on utility installations.
- Do not allow in controlled access unless no feasible alternative exists.
- Exceptions to policy are reviewed by HQ Engineering Assessment Group.
- Existing highways converted to limited access. These highways may have a limited number of driveways to serve property along the road in addition to access at major crossroads. Existing utility facilities will usually be in place and will be required to serve residences and businesses along the road. Existing utilities, including service lines, may be retained within the right-of-way of these highways with adjustments as necessary to eliminate conflicts with an active project. New utility facilities along these routes will require approval by the State Utilities Engineer. Wherever practical, all new installations shall be located off the right-of-way or beyond the limit of access.
- Follow the rules established by the CFR, UAP [utility accommodation policy] and highway occupancy permit (HOP), and reach out to subject matter experts within the department on a project by project basis.
- Keeping the utility as far out near the right of way as possible—to reduce impacts to traffic during installation or maintenance.
- Obtaining dark fiber in lieu of cash when fiber optic lines are longitudinally placed on our controlled-access highways. We have been able to light up the fiber and connect ITS facilities such as changeable message boards, ramp meters, traffic cameras, etc. We also allow the longitudinal installation of electric transmission lines on controlled-access highways. It is a state law that these types of highways must be considered in transmission route planning. Many people feel that by locating them adjacent to our highway fence, it eliminates the need to clear a separate corridor for the transmission line thereby minimizing environmental impacts.
- Refer to our Accommodation Policy.
- Telecoms share and barter facilities with the DOT. Future-use conduits are installed once and used for multiple telecoms.
- Very restricted.
- We do some sharing of fiber with our state-owned fiber/communications company.
- We only allow utilities to install within the right-of-way if they are located outside the denial of access line and are able to access their facilities from a frontage road.
- With the exception of interstate highways, state law allows the DOT to establish and purchase utility corridors during reconstruction of controlled access projects. The best practice is to identify early in the design process (at 30% design) that corridors are needed. Once that has been determined, the involved utility owners and the DOT determine and agree to size, location and where each utility is located within the corridor.

Abbreviations used without definitions in TRB publications:

A4A	Airlines for America
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	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
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
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

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