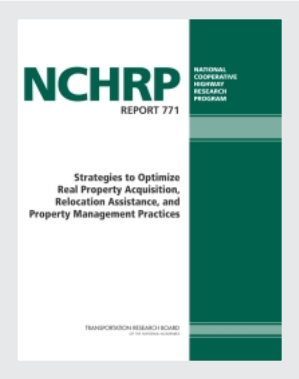

Strategies to Optimize Real Property Acquisition, Relocation Assistance, and Property Management Practices

DETAILS

201 pages | | PAPERBACK
ISBN 978-0-309-30810-6 | DOI 10.17226/22252

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

NCHRP REPORT 771

Strategies to Optimize Real Property Acquisition, Relocation Assistance, and Property Management Practices

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Subscriber Categories
Administration and Management • Planning and Forecasting

Research sponsored by the American Association of State Highway and Transportation Officials
in cooperation with the Federal Highway Administration

TRANSPORTATION RESEARCH BOARD

WASHINGTON, D.C.
2014
www.TRB.org

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

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NCHRP REPORT 771

Project 20-84
ISSN 0077-5614
ISBN 978-0-309-30810-6
Library of Congress Control Number 2014952725

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NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

are available from:

Transportation Research Board
Business Office
500 Fifth Street, NW
Washington, DC 20001

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http://www.national-academies.org/trb/bookstore

Printed in the United States of America

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AUTHOR ACKNOWLEDGMENTS

The research reported herein was performed under NCHRP Project 20-84 by the Texas A&M Transportation Institute (TTI) in collaboration with Pinnacle Consulting Management Group Inc., eVision Partners Inc., and Jackson Walker L.L.P. TTI was the prime contractor for this study, with Sponsored Research Services at the Texas A&M University System serving as Fiscal Administrator. Dr. Cesar Quiroga, P.E., Senior Research Engineer at TTI, was the Principal Investigator. The other authors of this report are Dr. Ioannis Tsapakis, Assistant Research Scientist, and John Overman, Associate Research Scientist, both at TTI; Dr. Stuart Anderson, Professor of Civil Engineering at Texas A&M University; Lisa Harrison, President, Alex Souder, Senior Vice President, and Aaron Adkins, Program Manager, all at Pinnacle Consulting Management Group; Robert Cooney, President at eVision Partners; and Robert Neblett, Head of the Eminent Domain Section, and W. Brad Anderson, Associate, at Jackson Walker L.L.P.

FOREWORD

By David A. Reynaud
Staff Officer
Transportation Research Board

This report provides (a) improved, integrated real property procedures and business practices in the project development and delivery process; and (b) suggestions to improve property management practices. An online survey, follow-up interviews, and a peer exchange meeting were used to determine which business practices are critical to the mission of the project development and delivery process and real property management. This report will be of interest to right-of-way administrators and real property managers.

Inefficiencies in the process to acquire and manage real property have a significant impact on the ability of transportation agencies to develop and deliver transportation projects effectively. Acquisition of real property is frequently on the critical path of transportation projects. Delays in acquiring real property are one of the main reasons (along with environmental reviews and utility relocations) for project delays and cost overruns.

Current right-of-way practice and procedural manuals are the products of forty years of statutes, case law, regulations, management styles, and best practices, brought into compliance with the requirements in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act). State procedures vary widely because of differences in state laws. Local agencies are required to follow state DOT procedural manuals when they use state or federal funding. Questions arise as new staff try to understand the reason or underlying basis for requirements. Contractors and consultants face a wide array of requirements and forms among the various states.

The objective of NCHRP Project 20-84 was to develop (1) improved right-of-way procedures and business practices for the project development and delivery process, and (2) best practices for the long-term management of real property interests. This research compares a typical right-of-way business model currently in compliance with the Uniform Act and federal regulations with an improved model based upon an objective analysis of its key elements.

The research was performed by Texas A&M Transportation Institute and produced (a) an integrated model of the transportation project development and delivery process, including a real property acquisition and relocation assistance model in accordance with 42 U.S.C. 4601 et seq.; (b) a reference real property acquisition and relocation assistance work schedule; and (c) a discussion of issues and challenges affecting project development and delivery that typically involve real property components, as well as strategies to address those issues and challenges. Standalone versions of the integrated model and reference work schedule were also developed and are included with this report in the attached CRP-CD 154.

CONTENTS

Note: Photographs, figures, and tables in this report may 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 full-color versions.

SUMMARY

Strategies to Optimize Real Property Acquisition, Relocation Assistance, and Property Management Practices

Introduction

Inefficiencies in the process used to acquire and manage real property have a significant impact on the ability of transportation agencies to develop and deliver transportation projects effectively. Acquisition of real property is frequently on the critical path of transportation projects. Along with environmental reviews and utility relocations, delays in acquiring real property are one of the main reasons for project delays and cost overruns.

NCHRP Project 20-84 was intended to (a) develop improved, integrated real property procedures and business practices in the project development and delivery process; and (b) develop suggestions to improve property management practices. Of particular interest was comparing typical business practices against the requirements in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended by Congress (the Uniform Act, codified in the U.S. Code as 42 U.S.C. 4601 et seq.), but without regulatory encumbrances—more specifically, provisions in Title 49 of the U.S. Code of Federal Regulations (49 CFR 24).

The analysis was to determine which business process elements were critical to the mission of the real property function according to the requirements of federal law, identify strategies to improve or optimize those elements, and identify which business process elements were not critical and could, therefore, be improved or removed.

The analysis included an evaluation of factors internal to the acquisition and management of real property (i.e., typical right-of-way factors), as well as factors related to the integration of these activities with the rest of the transportation project development and delivery process. Typical right-of-way factors included, but were not limited to, appraisal and appraisal review, acquisition and negotiations, titles and closing, condemnation proceedings, settlements, relocation eligibility determination, relocation assistance and payments, and contracting for services. Also included were utility accommodation and relocation, property management, encroachment remediation, and administrative costs (including training). Factors related to the integration between real property activities and the rest of the project development and delivery process included, but were not limited to, integration points and scheduling.

Findings

Assessment of Real Property Acquisition and Property Management Practices

The research team conducted an online survey, follow-up interviews, and a peer exchange to (a) assess real property acquisition and property management practices around the

country, and (b) gather ideas on issues, challenges, and best practices. Highlights of the information gained from these activities included the following:

- **Issues, challenges, and business practices.** The two most significant challenges identified by state departments of transportation (DOTs) were (a) changes to real property acquisition requirements late in the design phase, and (b) lack of sufficient involvement of right-of-way staff during design. State DOTs also identified lack of involvement by right-of-way personnel in the early phases of the project development process (planning and programming, preliminary design, and environmental process) as well as during utility coordination as a significant issue. Likewise, respondents highlighted critical staffing issues as a challenge, including staff turnover and difficulty in hiring and retaining staff with adequate real property acquisition experience.
- **Outsourcing real property activities.** In general, state DOTs value using consultants when the internal workload is heavy and the DOT does not have the resources to accommodate the demand; however, feedback from state DOTs indicates that serious issues exist in relation to effectively using consultant staff. Such issues include the quality of deliverables, quality of customer service, and amount of management oversight required, as well as higher overall costs to the state DOT and higher condemnation rates when using consultants versus internal staff.
- **Performance measures.** State DOTs use or need a variety of performance measures in connection with the acquisition of real property for transportation projects. Although most participants agreed about the need to measure the effectiveness of the real property acquisition process, several participants cautioned about using performance measures blindly in the context of a process that involves taking private property for the benefit of a transportation project.
- **Changes to laws and regulations.** Only a few participants indicated that there was an urgent need for changes to federal or state laws and regulations. Nonetheless, participants highlighted the need for some changes (e.g., in relation to appraisal waiver limits, relocation benefits for businesses, and timelines related to condemnation proceedings).
- **Business practices, unique processes, and strategies.** Participants provided substantial feedback regarding business practices, unique processes, and strategies their agencies have implemented, or are planning to implement, to streamline real property processes. For example, participants highlighted the need to improve internal coordination within their agencies, particularly with respect to the timing of involvement of right-of-way personnel in the project delivery process. Participants also highlighted the need for more effective coordination with external stakeholders such as federal agencies, railroad companies, and utility owners.
- **Training.** State DOTs provide two types of training and development opportunities, in-house and external, in addition to on-the-job training and mentoring. Some training courses are state certified or pre-approved for continuing education credits for real estate and appraisal licensing. Some agencies have agreements with colleges in their states that offer courses on real property topics. Participants highlighted that training opportunities have decreased substantially in recent years because of budgetary constraints.
- **Property management.** Agencies use a variety of data management platforms for property management purposes. Although databases and web-based mapping tools are increasingly used, computer-aided design (CAD) or geographic information system (GIS) platforms are rarely used to support property management activities. The most significant challenge participants identified in this area was difficult-to-use databases or information systems. Participants also highlighted difficulty in tracking and moni-

toring real property use as an issue, including how to deal with illegal or unauthorized encroachments.

Integrated Transportation Project Development and Delivery Process Modeling

The research team developed an integrated model of the transportation project development and delivery process that takes into account real property acquisition workflows and requirements. The integrated model has been provided as a reference tool on CRP-CD 154, which accompanies this report. The reference tool has three versions, provided in Microsoft® Visio 2010® format and portable document format (PDF) files, as follows:

- **Level 1.** This model provides a high-level depiction of the entire transportation project development and delivery process.
- **Level 2.** This model provides an intermediate-level depiction of the entire process.
- **Level 3.** This model provides a detailed depiction of the real property acquisition process according to the Uniform Act (42 U.S.C. 4601 et seq.).

Developing the reference tool involved analyzing each provision in the three subchapters of the Uniform Act and then mapping each provision to its corresponding location on the transportation project development and delivery process, taking into consideration functional areas and interdependencies. For completeness, the research team also mapped the relationships between Uniform Act and federal regulation provisions.

Reference Real Property Acquisition and Relocation Assistance Work Schedule

The research team also developed a reference work schedule that incorporates the requirements and procedures in the Uniform Act into a reference (or typical) transportation project and delivery process. The reference work schedule, which was developed in Microsoft Project 2010®, also is provided on CRP-CD 154 in both Project format and PDF. The reference work schedule includes tasks that represent Level 2 model swim lanes and activities, as well as Level 3 model activities. The reference work schedule could be used for a variety of applications (e.g., for assigning resources to tasks, managing project budgets, analyzing workloads, facilitating coordination with internal and external stakeholders, adjusting schedules, monitoring project progress, and preparing reports). It could also be used for training purposes.

Strategies for Improvement or Optimization

The research team analyzed key elements of the state project development and delivery process to identify opportunities for a more effective integration of real property-related activities with the rest of the process. The analysis focused on process activities with a significant real property component. Table 1 summarizes the issues, challenges, and strategies identified during the research. The research team identified 153 issues and challenges, and 176 strategies for improvement or optimization. (The higher totals presented in Table 1 reflect the fact that some issues, challenges, and strategies are common to several process activities.) In total, 71 issues and challenges and 80 strategies were identified in connection with activities from appraisals to relocation payments that are explicitly accounted for in the Uniform Act.

Table 1. Issues, challenges, and strategies for improvement or optimization.

Project Development and Delivery Process Activity with a Significant Real Property Component	No. of Issues Identified	No. of Strategies Identified
DEFINITION, SELECTION, FINANCING, AND SCHEDULING	**14**	**15**
Prepare Cost Estimate and Identify Funding Sources	6	12
Secure Federal, State, and Local Agreements	8	3
ALTERNATIVE ANALYSIS AND PRELIMINARY PLANS	**7**	**8**
Conduct Conceptual Design Meeting	2	2
Collect Data for Preliminary Design	1	2
Obtain Permission to Enter Property	3	2
Conduct Value Engineering Study	1	2
ENVIRONMENTAL PROCESS	**7**	**14**
Prepare Draft Environmental Documentation	1	5
Conduct Public Meetings	2	4
Meet Environmental Commitments after Clearance	2	3
Conduct Environmental Reevaluation	2	2
DESIGN AND PLANS, SPECIFICATIONS, AND ESTIMATES (PS&E) ASSEMBLY	**11**	**12**
Conduct Design Meeting	2	5
Develop Final Horizontal and Vertical Alignments	3	1
Conduct Detailed Design	2	1
Conduct 30%, 60%, and 90% Design Meetings	1	1
Prepare PS&E Package	1	2
Conduct Final Design and Initial Construction Coordination Meetings	2	2
RIGHT-OF-WAY MAP, AUTHORIZATION TO ACQUIRE PROPERTY, PROPERTY ACQUISITION, AND RELOCATION ASSISTANCE	**93**	**99**
Provide Planning and Real Property Acquisition Linkages	1	1
Conduct Real Property Research	2	5
Coordinate with Other Stakeholders	6	5
Prepare Right-of-Way Map and Property Descriptions	7	4
Obtain Authorization to Acquire Real Property	2	2
Conduct Appraisal or Waiver Valuation	14	13
Establish Just Compensation	1	2
Prepare and Make Written Offer	3	5
Acquire by Negotiation	13	15
Acquire by Condemnation	7	5
Demolish and Dispose Improvements	2	2
Prepare Right-of-Way Certification	1	1
Determine Relocation Assistance Eligibility	10	9
Provide Relocation Assistance Advisory (Residential)	7	7
Provide Relocation Assistance Advisory (Non-Residential)	5	5
Issue Relocation Payments (Residential)	8	11
Issue Relocation Payments (Non-Residential)	4	7
PROPERTY MANAGEMENT	**16**	**15**
Inventory and Manage Property Interests	9	7
Lease Property Interests	2	3
Dispose of Property Interests	5	5
UTILITY CONFLICT ANALYSIS, PERMITS, RELOCATION, AND REIMBURSEMENT	**10**	**10**
Provide Planning and Utility Process Linkages	2	2
Conduct Coordination Meetings	2	2
Prepare and Execute Utility Agreements	3	4
Monitor Utility Relocations and Reimburse Utility Owners	3	2

Table 1. (Continued).

Project Development and Delivery Process Activity with a Significant Real Property Component	No. of Issues Identified	No. of Strategies Identified
PROJECT MANAGEMENT	**3**	**6**
Establish Project Management Team	1	2
Manage Project Development and Delivery Process	2	4
OTHER*	**13**	**16**
Program Management and Administration*	2	3
Staffing and Training*	6	8
Outsourcing*	5	5

* Not a specific project development and delivery process activity.

Conclusions and Suggestions

The research for NCHRP Project 20-84 produced the following results:

- An integrated model of the transportation project development and delivery process, as well as a real property acquisition and relocation assistance model in accordance with the Uniform Act (42 U.S.C. 4601 et seq.).
- A reference work schedule for real property acquisition and relocation assistance.
- A detailed list of improvement or optimization strategies to address issues and challenges that affect project development and delivery process activities with significant real property components.
- A detailed list of improvement or optimization strategies to address issues and challenges that affect project development and delivery process activities with significant real property components.
- A standalone version of the integrated process model was also developed and is included with this report on CRP-CD 154.
- A standalone version of the reference work schedule was also developed and is included on CRP-CD 154.

Implementing these results nationwide will likely yield benefits such as the following:

- A streamlined business process for real property acquisition and relocation assistance that facilitates data exchange and encourages communication and coordination among stakeholders, including stakeholders within the same agency.
- Improvements in efficiency and reduction of redundancy in real property activities by maximizing the use of concurrent (as opposed to linear) activities and by integrating real property activities within the project development and delivery process more effectively.
- More effective management of real property assets through the implementation of efficient inventory and database practices that take full advantage of the survey-quality data agencies already collect to support the acquisition of real property.
- More effective contracting practices that result in higher quality, cost-effective deliverables for the agency and more competent (and competitive) contractors.

General suggestions to implement the research results include:

- Engage research product champions early to address specific challenges for the successful implementation of the research suggestions.

- Identify funding mechanisms and submit proposals for implementation of the research products at one or more state DOTs.
- Engage public-sector real estate professionals and other interested stakeholders to advocate consideration of the proposed changes to the Uniform Act and for potential changes to state laws required to implement suggestions.
- Engage public-sector real estate officials to advocate consideration of the suggested changes to federal regulations.
- Develop guidebooks, sample templates and scoping forms, and other materials to support the implementation of suggested policy changes at state DOTs.
- Engage state DOTs in implementing suggested policy changes.
- Evaluate the state-level potential for increased use of technology to support real property business functions.
- Initiate a pooled fund study through AASHTO to define requirements, prepare a business case, and evaluate the potential for AASHTOWare™ applications to support integrated state DOT real property business functions.
- Develop criteria for monitoring the progress of implementation.

More specific suggestions to facilitate the implementation of these results at state DOTs include:

- Update relevant manuals, brochures, and other similar documents to depict both the project development and delivery process and the acquisition of real property and relocation assistance process using the Level 1, Level 2, and Level 3 process diagrams.
- Make the Level 1, Level 2, and Level 3 diagrams and the reference work schedule available online in multiple file formats so that they can be accessed by the transportation community.
- Develop a diagram similar to the Level 3 diagram to depict workflows related to Title 49 (49 CFR 24).
- Seek funding through FHWA for state-specific implementation assessment workshops to help states identify gaps in their current real property business practices (in terms of the process models) and to develop detailed implementation plans for transitioning to the suggested process models.

NCHRP Report 771 summarizes the work completed during NCHRP Project 20-84. The report is divided into the following chapters:

- Chapter 1 introduces the project.
- Chapter 2 summarizes the results of the surveys and interviews conducted to identify business practices and issues, as well as the literature review of prior studies and initiatives.
- Chapter 3 describes a typical model of the transportation project development and delivery process, as well as a real property acquisition and relocation assistance model in accordance with the requirements in the Uniform Act (42 U.S.C. 4601 et seq.).
- Chapter 4 describes a reference work schedule for real property acquisition and relocation assistance.
- Chapter 5 summarizes issues and challenges affecting project development and delivery process activities that typically involve real property components, as well as strategies to address those issues and challenges.

- Chapter 6 provides a list of conclusions and suggestions.
- Appendix A shows the survey instrument.
- Appendix B provides a summary of survey results.
- Appendix C provides a description of integrated transportation project development and delivery process phases and activities.
- CRP-CD 154, which is provided with the report, provides standalone files containing the Level 1, Level 2, and Level 3 models and the reference work schedule for real property acquisition and relocation assistance in Microsoft Visio 2010 (for the models), Microsoft Project (for the reference work schedule), and PDF (for both the models and the reference work schedule).

CHAPTER 1

Background

Existing real property acquisition, relocation assistance, and property management practices at transportation agencies around the country are the result of decades of statutes, case law, regulations, and policies. Acquiring and managing real property is a complex process that attempts to balance, on the one hand, the goal to deliver transportation projects on time and within budget and, on the other hand, the need to comply with private property rights as required by the U.S. Constitution. Despite the availability of procedural manuals, brochures, guidelines, and training opportunities, officials at the federal, state, and local levels have considerable difficulty understanding the myriad laws, regulations, and policies that govern the acquisition and management of real property for transportation purposes. This is especially true for those who are new to the right-of-way profession and for project managers, engineers, planners, and other stakeholders who do not deal with real property procedures on a daily basis.

Inefficiencies in the process used to acquire and manage real property have a significant impact on the ability of transportation agencies to develop and deliver transportation projects effectively. Acquisition of real property is frequently on the critical path of transportation projects. Along with environmental reviews and utility relocations, delays in the acquisition of real property are one of the main reasons for project delays and cost overruns. Not surprisingly, great interest exists at all levels in the development of techniques and strategies to increase the effectiveness of the acquisition and management of real property with a goal to improve the development and delivery of transportation projects.

The overall objective of NCHRP Project 20-84 was to (a) develop improved, integrated real property procedures and business practices in the project development and delivery process; and (b) develop suggestions to improve property management practices. Of particular interest was comparing typical business practices against the requirements in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended by Congress (the Uniform Act, codified as 42 U.S.C. 4601 et seq.), but without regulatory encumbrances—more specifically, provisions in Title 49, Part 24 of the Code of Federal Regulations (49 CFR 24). The goal of this analysis was to determine which business process elements were critical to the mission of the real property function according to the requirements of federal law (and identify strategies to improve or optimize those elements), and determine which business process elements were not critical (and therefore could be either removed or improved).

The analysis included an evaluation of many factors internal to the acquisition and management of real property (i.e., typical right-of-way factors) as well as factors related to the integration of these activities with the rest of the project development and delivery process. Typical right-of-way factors included, but were not limited to, appraisal and appraisal review, acquisition and negotiations, titles and closing, condemnation proceedings, settlements, relocation eligibility determination, relocation assistance and payments, and contracting for services. Also included were utility accommodation and relocation, property management, encroachment remediation, and administrative costs (including training). Factors related to the integration between right-of-way activities and the rest of the project development and delivery process included, but were not limited to, integration points, scheduling, and linear versus parallel activities.

CHAPTER 2

Survey, Follow-up Interviews, and Literature Review

Introduction

This chapter summarizes the results of an online survey and follow-up interviews to (a) assess real property acquisition and property management practices around the United States; and (b) gather ideas on issues, challenges, and best practices. The chapter also summarizes ideas and recommendations gathered from a sample of previous initiatives and studies.

Online Survey and Follow-up Interviews

Methodology

The online survey conducted for NCHRP Project 20-84 targeted relevant AASHTO subcommittees (Right-of-Way, Utilities, and Outdoor Advertising Control; Design; and Legal Affairs); the TRB Committee on Eminent Domain and Land Use; and relevant International Right-of-Way Association (IRWA) committees (Relocation, Transportation, Valuation, and Asset Management). AASHTO subcommittee members included state DOT representatives (typically from headquarters) and their corresponding FHWA counterparts. This list included all 50 states, the District of Columbia, and Puerto Rico. Members of the TRB Committee on Eminent Domain and Land Use represented a wide range of stakeholders, including state DOTs, FHWA, consultants, and attorneys in private practice. In the case of the IRWA committees, although IRWA did not release information about number of members or demographic data for each of the committees, informal conversations with IRWA officials suggested that each committee had 20–30 members representing a wide range of agencies, including federal, state, and local levels, in both the public and private sectors.

Appendix A to *NCHRP Report 771* provides a copy of the survey instrument. The online survey included two versions of the survey instrument, one for state DOTs and one for consultants. Having separate questionnaires was useful for establishing differences between public- and private-sector representatives with respect to issues and the identification of strategies for streamlining and optimization. The project budget did not support the inclusion of local public agencies (LPAs) in the survey and follow-up interviews. Nevertheless, state DOT representatives and consultants provided a wealth of information about the interaction between state transportation agencies and LPAs, including issues, challenges, and potential strategies.

The research team emailed invitations to participate in the survey to representatives of all 50 states, the District of Columbia, and Puerto Rico, using as a basis the preliminary list of potential participants that had been developed previously. The email invitations included a request for recipients to forward the invitation to regional-level and district-level personnel such as right-of-way, design, and project managers and administrators, as well as other personnel involved in real property acquisition (e.g., attorneys) and the interaction between right-of-way activities and other project development and delivery process activities. Although not statistically controlled, the strategy was intended to gather as much information as possible from both headquarters and regional offices. In total, 104 individuals representing 38 state DOTs responded to the agency survey, for an overall agency response rate of 73 percent. For the consultant survey, the response was 24 participants from 13 states, for an overall response rate at the state level of 46 percent.

The research team complemented the online survey with follow-up interviews and a peer exchange. The purpose of these activities was to clarify some of the survey responses and to seek additional information with respect to specific issues, strategies, and potential suggestions. More than 50 representatives of state agencies, the federal government, and the private sector participated in the follow-up interviews and the peer exchange.

Lessons Learned

Appendix B provides a detailed description of the survey results. It is worth noting that the survey and some of the interviews took place in 2011 (i.e., before MAP-21 was enacted). This section presents a summary of lessons learned from the survey and follow-up interviews, taking into account the changes that MAP-21 introduced in 2012.

- **Survey participation.** There was a wide participation of state DOT personnel from field offices. In total, 58 percent of participants were participants from headquarters, with the remaining 42 percent of participants representing field offices. There was also a wide participation across various organizational hierarchy levels (25 percent directors, 61 percent managers, and 14 percent support staff). Survey participants were primarily involved in the acquisition of real property. Involvement in real property acquisition covered the entire spectrum of activities, from appraisals to payments.
- **Issues, challenges, and business practices.** Participants were asked about the level of impact of a variety of issues that state DOTs face when acquiring real property for transportation projects. Most participants attributed the highest impact to changes in real property acquisition needs late in the design phase and lack of involvement of right-of-way staff during design. Not involving right-of-way personnel in earlier phases (planning and programming, preliminary design, and environmental process) as well as during utility coordination also was perceived as having a major impact.

  Respondents pointed to staffing issues as having a major impact, including both staff turnover and difficulty in hiring and retaining staff with adequate real property acquisition experience. Respondents further highlighted as a significant issue the lack of public-sector real property experience among consultants. Another significant issue that resonated with survey participants was external entities (e.g., law firms) advising property owners not to negotiate as a tactic to obtain more money during condemnation proceedings.

  Inadequate cost estimates for real property acquisition also was an issue that resonated with survey participants. From the perspective of state DOTs, however, the level of impact of inadequate cost estimates was not as high as that of some other issues. (Although not clarified through the survey, a possible reason for this response may be that other units within their agencies deal with project funding issues more directly than do those who participated in the survey.)

  Participants were asked to provide feedback with respect to types of real property acquisitions that state DOTs consider particularly problematic (e.g., problematic in terms of time and cost). Although there were problems with the way this survey question was designed, the feedback indicates that state DOTs have issues with certain types of real property acquisitions, particularly railroad interests (either operating or abandoned). Acquisitions of non-residential (developed) property and acquisitions involving outdoor advertising sign interests also tend to be problematic.
- **Outsourcing real property activities.** The range of responses on this topic was quite wide, from participants reporting great results to participants reporting complete dissatisfaction. In general, state DOTs value using consultants when the internal workload is heavy and the DOT does not have the resources to accommodate the demand; however, feedback from state DOTs indicates there are serious issues with this approach. Examples of issues include quality of deliverables (e.g., too many mistakes or cutting corners), quality of customer service (e.g., not interacting effectively with property owners or focusing more on quantity of production than quality of production), and the amount of management required (i.e., state DOTs needing to spend a significant amount of time managing consulting contracts). Other issues include higher overall costs to the state DOT and higher condemnation rates.
- **Performance measures.** State DOTs use (or have a need for) a variety of performance measures in connection with the acquisition of real property for transportation projects. The two most popular performance measures were (a) number of parcels or property interests to acquire, and (b) time to complete critical activities. Beyond these basic measures, state DOTs were particularly interested in measures such as the difference between administrative settlement amounts and approved appraisals, number of properties acquired by negotiation, number of properties acquired by condemnation, and number of properties acquired or in possession prior to letting.

  Although most participants agreed about the need to measure the effectiveness of the real property acquisition process, several participants cautioned about using performance measures blindly in the context of a process that involves taking private property for the benefit of a transportation project. One participant summarized this concern in terms of the need for a measure that looks at the "organizational effectiveness of having the right people in the right place at the right time."
- **Changes to laws and regulations.** Only a few participants indicated that there was an urgent need for changes to federal or state laws and regulations. Participants indicated instead that the most pressing issues related to real property activities were the lack of early involvement by right-of-way personnel in the project development process, lack of sufficient time to acquire real property, or changes to parcels late in the design phase. These considerations aside, many participants highlighted the need for some changes to laws and/or regulations, such as those related to appraisal waiver limits, relocation benefits for businesses, and timelines related to condemnation proceedings.

- **Business practices, unique processes, and strategies.** Participants provided a substantial amount of feedback regarding business practices, unique processes, and strategies their agencies have implemented (or are planning to implement) to streamline real property processes. The range of ideas submitted was quite wide. Not surprisingly, they were rooted, for the most part, on the existing legislative and regulatory framework. Nonetheless, they provide a glimpse of the types of improvements and streamlining in which practitioners would be interested.

  For example, participants highlighted the need to improve internal coordination within their agencies, particularly with respect to timing the involvement of right-of-way personnel (e.g., making sure that the right-of-way map is finalized at least a certain number of months before the project letting date, involving right-of-way personnel earlier in the process, and holding project meetings often). Survey participants also highlighted the need for more effective coordination with external stakeholders such as the General Services Administration (GSA), railroad companies, and utility owners.

  Many of the ideas related to specific real property acquisition functions. For example, several ideas involved raising the limit on appraisal waivers or evaluating situations that entail low-impact business risks. Other ideas involved raising the limit for relocation payments (primarily for businesses) and using incentives and other strategies to encourage more effective participation by property owners. Many other suggestions dealt with staffing and outsourcing, most of them related to the need to develop and maintain an appropriate level of resources to be able to respond effectively to real property acquisition needs.
- **Training.** Participants provided information about the kind of training and professional development that state DOTs offer to staff members who work in real property acquisition activities. Feedback from participants indicates that state DOTs provide two types of training and development opportunities—in-house and external—in addition to on-the-job training and mentoring. In-house training and development include a variety of options, such as formal classes on specific topics, peer exchange meetings, and annual conferences. Some agencies offer these training opportunities to agency staff as well as contractors and LPAs. Some of the courses are state-certified or pre-approved for continuing education credits for real estate and appraisal licensing. External training and development options include FHWA webinars and IRWA, National Highway Institute (NHI), and Appraisal Institute courses. Some agencies have agreements with colleges in their states that offer courses on real property topics. A number of survey participants highlighted that training opportunities have decreased substantially in recent years due to budgetary constraints.
- **Property management.** Participants provided information about property management practices, including types of real property their agencies normally acquire for transportation projects, what kinds of uses are allowed on those properties, what kinds of data platforms are used for property management purposes, and what kinds of issues faced by state DOTs have a major impact on their ability to manage real property effectively. Most participants indicated their state DOTs acquire properties in fee simple for transportation projects. Frequently, state DOTs also acquire access rights. Easements from a variety of stakeholders (e.g., private owners or LPAs) also are quite common. Much less frequently, although still common, is the acquisition of real property that excludes mineral, oil, or gas rights.

  State DOTs allow a wide range of uses on state right-of-way. Most of the uses are traditional uses such as driveways, utility installations, and leases (including short-term residential dwelling leases), although some interest exists in alternative uses such as solar energy and carbon sequestration.

  Agencies use a variety of data management platforms for property management purposes. In general, office applications (e.g., spreadsheets, word processors, and desktop databases) are common. Server-based databases also are common, reflecting a trend throughout the transportation industry, in which the use of this platform is increasing for a variety of applications. The use of web-based mapping tools is common, reflecting the increasing acceptability of this type of platform to support a wide range of applications, including property management. However, CAD and GIS platforms are not as commonly used for property management applications as other data management platforms.

  The highest impact reported by participants resulted from difficult-to-use databases or information systems to manage real property assets. Difficulty in tracking and monitoring real property uses was also highlighted as having a significant impact. Participants further indicated that one of the most significant issues affecting the ability of state DOTs to manage real property effectively was illegal or unauthorized encroachments.

Previous Initiatives and Studies

FHWA Project Development Guide

The FHWA *Project Development Guide* (*1*) lists the following opportunities to simplify and streamline the real property acquisition process:

- Selection of the appropriate appraisal format.
- Appraisal waiver for non-complex and low-value acquisitions.
- Use of a roster of qualified appraisers.
- Use of single appraiser/negotiator.

- Notice of intent to acquire.
- Use of the minimum payment provision.
- Use of accelerated negotiations (first contact by mail).
- Use of administrative settlements.
- Use of a brochure to explain the acquisition process.
- Use of simplified title report procedures and innovative title data purchases.
- Use of qualified real property acquisition and relocation assistance contractors.

Participants in the NCHRP Project 20-84 survey highlighted many of these opportunities, both in the context of already-implemented strategies or strategies the participants' agencies were planning to implement to expedite the acquisition process. Other strategies outlined in the FHWA *Project Development Guide* include protective buying and hardship acquisitions before processing the final environmental document (which can be done after the agency has notified the public that it has selected a preferred alignment, or a public hearing has been held or an opportunity for the hearing has been afforded). Hardship and protective buying acquisitions normally apply if the number of parcels is small. The guide notes that a provision introduced in 1991 allows agencies to acquire properties before completion of the environmental process when using their own funds and, under certain specific circumstances, to be reimbursed if the agency complies with specific requirements. The guide also recommends that agencies allow sufficient time to accomplish the statutory requirements in the Uniform Act.

2005 Domestic Scan on Advance Acquisition and Corridor Preservation

In 2005, the FHWA Office of Real Estate Services sponsored a domestic scan to discuss experiences and best practices in the areas of advance acquisition and corridor preservation (*2*). One goal of the scan was to identify strategies to streamline the advance acquisition process and ways that advance acquisition could be used as a corridor preservation tool. Recommendations from scan participants included the following:

- Establish a designated source of funds for advance acquisition that is reliable and not re-programmable to other uses. Scan participants recommended that the source of funds originate at FHWA.
- Treat the acquisition of real property as a neutral activity from an environmental review perspective, as long as those activities do not compromise environmental laws and regulations, and as long as the issue of necessity raised in condemnation situations is addressed.
- Solicit voluntary sales by willing sellers and proactively respond to property owners who initiate such sales. These acquisitions should not be required to satisfy hardship or protective buy standards. The process should allow the acquisition of real property on a project-wide basis, particularly if the project is anticipated to be classified as a categorical exclusion (CE) project instead of only on a parcel-by-parcel basis.
- Update regulations and policies at FHWA to promote corridor preservation by encouraging states to pursue corridor preservation as a goal and to enact appropriate legislation to support that goal. Scan participants recommended providing flexibility and streamlining requirements (e.g., by treating acquisitions for new alignments and changes to existing alignments differently, acknowledging that a single standard for all states is probably not feasible or effective).
- Implement corridor preservation mapping applications to enable agencies to share information about future corridors with communities, developers, and property owners in a way that gives state DOTs a say in development decisions and encourages developers to coordinate their development and transportation needs with state DOTs.
- Formalize the use of purchase options to give state DOTs the right to acquire certain properties before development occurs on those properties. One of the advantages of using purchase options is the ability to address contentious negotiation issues up front. A disadvantage is the additional cost in the form of a fee to secure the purchase option.

2006 FHWA Study on Present and Future Public-Sector Real Estate Needs and Solutions

In 2006, FHWA completed a research project to identify tools that FHWA and other federal agencies that conduct real estate acquisitions would require to provide services efficiently and effectively for the following 30 years (*3*). The research also identified present and future public-sector real property needs and possible solutions in areas such as early integration and coordination, flexibility in laws and regulations, training and education, recruitment, public relations, and technology. Recommendations from the study, grouped by major category, can be summarized as follows:

- Recommendations for FHWA—project development process:
  - Encourage state DOTs to emphasize the need for real property involvement in all phases of project development.
  - Implement a mandate that in order for an agency to receive federal funds, real property considerations must be fully integrated throughout the project development process.

  - Develop a design acceptance stage that runs concurrently with other functions of the project development process.
  - Implement a public awareness program that includes a systematic approach for addressing property owner concerns in order to change the public perception of acquisition of private property under eminent domain.
  - Promote the use of technologies such as GIS.
- Recommendations for FHWA—training and professional development:
  - Make training a top priority and act as an advocate in making real property a major policy issue for state DOTs.
  - Develop and disseminate cost-effective educational tools and techniques while continuing to offer traditional classroom courses for advanced topics.
  - Emphasize the right-of-way discipline in recruiting efforts and develop partnerships with universities, vocational institutions, and community colleges.
  - Encourage engineering schools to expand their curriculum to include courses on real property acquisition and the project development process.
  - Become an advocate for the right-of-way profession as a career path.
  - Help state DOTs to develop the right-of-way profession as a career path.
  - Identify funding sources for scholarships through agencies such as AASHTO and IRWA.
  - Support state DOT right-of-way managers in developing and delivering a statewide real property training and education program to internal staff as well as metropolitan planning organizations (MPOs) and LPAs.
- Recommendations for state DOTs:
  - Encourage long-range planning and coordination with MPOs and LPAs in the preservation of future right-of-way.
  - Gain understanding and buy-in from engineering management of the priority of right-of-way in the project development process.
  - Integrate the right-of-way function early in the project development process.
  - Work with public relations experts and be present at project public meetings to answer questions and address the public's concerns regarding real property impacts.
  - Involve property owners and the surrounding community from the beginning and throughout the project development process.
  - Provide the necessary resources to elevate training and education within the agency.
  - Create a public-private partnership with consultants to provide cross-training and help with the retention of institutional knowledge on both sides.
  - Utilize technologies such as GIS to develop a more efficient and effective program.
- Recommendations for changes to federal legislation—Uniform Act:
  - Give states the authority to react as needed to situations relating to the administration of their own right-of-way program.
  - Allow states to develop and document their own quality assurance/quality control (QA/QC) processes, which FHWA can continue to monitor for compliance.
  - Require presentation of the appraisal at the time of the offer to purchase property. (Note: Stakeholder participants did not reach a consensus on this recommendation.)
  - Allow for payment of attorney fees up to a certain percentage of the award to protect property owners uniformly. (Note: Stakeholder participants did not reach a consensus on this recommendation.)
  - Provide for a simplified program for small, non-complex projects that allows a lump-sum payment (global settlement) or a self-service relocation claim.
  - Allow the states additional payment authority over the statutory caps.
- Recommendations for changes to federal legislation—National Environmental Policy Act (NEPA):
  - Allow real property acquisition prior to the environmental documentation approval without prejudicing the outcome of the environmental process. It is worth noting that MAP-21, which was enacted in July 2012, introduced several provisions designed to accelerate project delivery and to promote efficiency and effectiveness in the process. One of these provisions addressed real property acquisition activities prior to the environmental document approval.
- Recommendations for changes to federal regulations—23 CFR 710:
  - Allow for construction clearance approvals on a parcel-by-parcel basis similar to design-build project provisions.
  - Authorize acquisition of real property necessary for right-of-way and mitigation sites in advance of the Record of Decision (ROD) based upon the reasonable necessity of the land for the project.
- Recommendations for changes to federal regulations—49 CFR 24:
  - Include the hardship and protective buying provisions of 23 CFR into 49 CFR 24, allowing agencies to acquire property under the same provisions.
  - Make changes to reflect any statutory changes recommended above.

Most of the recommendations from the 2006 FHWA study have been included, in one way or another, in this report.

Some recommendations from the 2006 FHWA study—more specifically, those recommendations dealing with training and development—are more specific than the feedback obtained through the NCHRP Project 20-84 survey and/or follow-up interviews (which consisted, in general, of examples of courses and other training opportunities currently available to right-of-way professionals).

On several other topics, more specifically dealing with the integration between right-of-way functions and the rest of the project development and delivery process, the 2006 FHWA study provided high-level ideas but did not include detailed, actionable recommendations. For example, one of the recommendations was to fully integrate right-of-way functions in all phases of project development for an agency to receive federal funds. From a practical perspective, however, "full integration" could mean many different things (e.g., an agency could develop a generic Gantt chart depicting right-of-way functions in the project development process and suggest this as an example of full integration), making it difficult to implement the recommendation without clear guidance and metrics as to what full integration means and entails.

2006 FHWA Study on Right-of-Way Professional Certification Needs

In 2006, FHWA conducted a study to evaluate real estate licensing requirements around the country with a goal to evaluate the feasibility of a professional certification program for public-sector real estate (*4*). The study included a survey of state licensing agencies, a survey of institutions and courses, interviews with federal agency officials, a web-based market needs study, and focus groups. Survey and focus group participants included federal agencies (50 percent of participants), state DOTs (25 percent of participants), private-sector firms (20 percent of participants), and other groups (5 percent of participants).

According to the study, 67 percent of participants indicated that professional right-of-way certification would be valuable and they would be likely to pursue it. The level of support for professional certification by type of agency (e.g., federal agencies, state DOTs, and LPAs) was not clear from the study. (Although some references to professional licensing and certification were made among NCHRP Project 20-84 survey responses, the level of responses regarding licensing and certification needs was extremely low. Readers are cautioned that this result does *not* mean that state DOT respondents were not interested in licensing and certification. Although a possible interpretation of the results is that licensing and certification was not on the radar screen of most NCHRP Project 20-84 survey participants, this may simply reflect the fact that the NCHRP 20-84 survey was not specifically designed to address licensing and certification issues.)

2005 National Listening Sessions

In 2005, FHWA conducted four national listening sessions that produced more than 180 comments. The listening sessions resulted in the identification of eight priority areas for potential updates of the Uniform Act, as follows (*5*):

- For residential housing payments, increase the limit from the current $22,500 to $31,000.
- For tenant payments, increase the limit from the current $5,250 to $7,200.
- For business reestablishment payments, increase the limit from the current $10,000 to $25,000.
- For business payments, increase the in-lieu payment limit from the current $20,000 to $40,000.
- Establish an index for future increases to avoid requiring additional congressional action to ensure the limits are current.
- Modify homeowners' occupancy requirements from the current 180-day and 90-day eligibility requirements to one 90-day owner-occupancy eligibility requirement, therefore simplifying criteria and calculations.
- Enhance reporting requirement by collecting information on program activity annually. Several federal agencies identified this potential change to address a limitation in the current process, highlighting that agencies often do not have good data on their program because reporting is not a requirement.
- Enhance Uniform Act services provided by federal agencies, including coordination, assistance, monitoring, research, and training.

Feedback from participants in the NCHRP Project 20-84 survey and follow-up interviews was consistent with these recommendations, particularly with respect to suggested updates to the Uniform Act regarding increases in business payment allowances and relocation assistance.

2007 FHWA Study on Federal Land Transfers

In 2007, FHWA completed a study to identify potential opportunities to improve the federal land transfer process (*6*). The scope of the study included analyzing the interagency agreement process, identifying best practices, and developing recommendations for improving the process on a national basis. Recommended steps for streamlining and standardizing federal land transfers included the following:

- Enhance communication and coordination between and within agencies.
- Encourage early involvement in the project development process by all affected agency realty resources.

- Update existing agreements to ensure consistency with specific agency policies and guidance.
- Provide access to sample deeds to help develop deed templates at the local level.
- Establish a website for sharing and accessing guidance documents and other resource materials related to federal land transfers.
- Evaluate increased use of centralized and/or dedicated resources for processing federal land transfers.
- Establish a model regional memorandum of understanding (MOU) based on the 2001 California MOU to strengthen procedures for ensuring the recording of deeds on a go-forward basis.
- Develop an overview workshop on the federal land transfer process.

2007 FHWA Study on Impacts of Implementing the Appraisal Waiver Provision

In 2007, FHWA completed a study examining the effectiveness of implementing the appraisal waiver provision in 49 CFR 24 for uncomplicated, low-value real property interests (*7*). The analysis revealed that most state DOTs considered the appraisal waiver option valuable and applied it if potential existed to save time and money. The study also identified best practices and developed recommendations to assist with implementation of the appraisal waiver provisions at the state and national levels. Examples of the recommendations included the following:

- Consider more factors than just the complexity and the value of a property interest when determining whether a waiver valuation is necessary.
- Use well-supported and current market information to support unit values in waiver valuations.
- Develop documentation standards for waiver valuations that are sufficient to justify the estimated value of a property.
- Establish guidance and promote best practices to facilitate the preparation of waiver valuations by non-appraisers. Knowledgeable non-appraisers can handle waiver valuations effectively; however, appraisers have important roles in identifying which parcels are appropriate for use of the waiver provisions and in compiling and evaluating market sales information and project-level analysis.
- Develop procedures that promote early contact with property owners to ensure that all impacts of the proposed acquisition become known to the property owners before completing the valuation. Early contacts are necessary to ensure equal attention and treatment to all property owners affected by a project.

Risk Assessment, Management, and Allocation

As will be described in more detail in subsequent chapters of this report, it is typical for agencies to estimate the duration of their real property acquisition process (e.g., 18–24 months from appraisals to project letting). Some agencies are experimenting with scheduling software tools to conduct what-if scenarios to understand the impact of activity changes within the overall schedule and the critical path of the real property process. Some state DOTs have also developed tables and red-flag summaries to identify situations that might result in project delays in connection with right-of-way activities. At least one state DOT has used dispersion measures (range and standard deviation) to document variations in the time it takes to complete real property acquisition activities.

Other than these examples, the NCHRP Project 20-84 literature review, survey, and interviews did not reveal a more widespread use of systematic techniques and procedures to assess risk in relation to real property activities or to translate that information to other dimensions such as impact (both real property and project-wide), costs (both real property and project-wide), or time and financial contingencies.

Documenting and managing risk is an essential element in the implementation of efforts to optimize and streamline processes. Conducting risk assessments involves framing issues within a risk context by considering both the likelihood and impact of a given event to trigger a vulnerability, as well as by identifying risk levels and mitigation strategies to address those risks (*8*). This analysis could be used to provide more realistic estimates of cost and duration with an explicit risk-based representation of contingencies that vary as more accurate information becomes available along the project development process.

A risk matrix is sometimes used to show the relationship between likelihood (rows/x-axis) and impact (columns/y-axis), with individual cells showing the result of multiplying a likelihood rating and an impact rating (*9*).

2008 International Scan on Right-of-Way and Utilities

In September 2008, a scan team composed of representatives of several state DOTs, FHWA, private industry, and academia visited Australia and Canada to learn about innovative practices for right-of-way and utility processes that might be applicable for implementation in the United States (*10*). The study team visited four state transportation agencies in Australia and two in Canada. This scanning study complemented a 2000 scanning study of European countries that covered Germany, the Netherlands, Norway, and the United Kingdom.

Based on the presentation of best practices by the host agencies in Australia and Canada, the 2008 study team identified

some 20 potential implementation ideas that could merit consideration in the United States. These ideas included the following:

- Project development and delivery methods:
  - Create a template for project-specific roles and responsibilities based on project type and configuration.
  - Promote an earlier integration of real property acquisition and utility coordination activities in the project development process.
  - Establish an operation and maintenance fee for developer-initiated transportation infrastructure.
- Real property acquisition:
  - Promote a cooperative relationship with property owners to facilitate the timely acquisition of real property.
  - Develop GIS-based real property acquisition and asset management systems.
  - Promote visualization techniques to communicate anticipated project impacts to property owners.
- Property management:
  - Develop GIS-based real property acquisition and asset management systems.
  - Promote active management of real property assets to maximize value and return on investment.
  - Establish a standard protocol and lease template for utility attachments to roadway structures.
  - Establish a template for roles and responsibilities of multiple parties that use infrastructure corridors.
- Other:
  - Pursue strategies to facilitate corridor preservation.
  - Develop a framework to establish proficiency of right-of-way and utility professionals in core disciplines.

2008 Peer Exchange on Acquisition and Relocation Incentive Payments

In August 2008, FHWA sponsored a peer exchange to share information on the use of acquisition and relocation incentive payments (*11*). The incentive payment initiative started from two pilot implementations after the 2000 scanning study of European countries (already discussed). The peer exchange highlighted the experiences of several state DOTs with the use of incentives.

Overall, the result reported by the states was a reduction in the time to acquire and clear real property and no reduction in property owner benefits. Measuring the impact on administrative, acquisition, legal, and court costs was difficult, however. Incentive practices varied widely among state DOTs. For example:

- The Florida DOT reported using a sliding scale of acquisition incentive payments depending on the approved compensation amount, ranging from a $1,000 incentive for an approved compensation of up to $1,000 to $150,000 for an approved compensation over $513,500. The Florida DOT reported a significant reduction in real property delivery time, a significant reduction in total payout (compared to the initial appraisal), and an increase in the negotiation settlement rate.
- The Indiana DOT reported offering an additional 10 percent of the acquisition amount, an additional 10 percent for temporary easements, and an additional 10 percent of the approved moving cost estimate or scheduled moving cost. The relocation incentive was prorated as follows:
  - 100 percent if the displaced person moved within 30 days.
  - 60 percent if the displaced person moved within 31 to 60 days.
  - 20 percent if the displaced person moved within 61 to 80 days.
  - 0 percent if the displaced person moved after 80 days.
- The Wisconsin DOT reported using set dollar amounts with a sliding scale for residential acquisition and relocation incentives and a percentage of the initial offer for business relocation incentives. For example, for residential relocations, the incentive payment was $10,000 if the property was conveyed and vacated within 45 days, $5,000 if within 60 days, $2,500 if within 90 days, and $0 after 90 days. For business relocations, the incentive payment was 5 percent of the initial offer (or $10,000, whichever was greater) if the property was conveyed and vacated within 60 days; 2.5 percent of the initial offer (or $5,000, whichever was greater) if the property was conveyed and vacated within 90 days; and $0 after 90 days.

2009 Right-of-Way, Design-Build, and Alternative Contracting Peer Exchange

In 2009, FHWA sponsored a peer exchange focusing on the experiences of several state DOTs with design-build contracting and the use of alternative contract procurement methods (*12*). The purpose of the peer exchange was to provide opportunities for peers to share best practices and lessons learned in design-build contracting and project delivery. Lessons learned and recommendations from the event included the following:

- Ensure upper-management buy-in for early right-of-way involvement.
- Engage right-of-way professionals early in project development.
- Use real property processes that can occur prior to the completion of the environmental review.
- Consult with utilities and property owners early in the real property acquisition process.

- Establish a reputation for fair real property acquisition negotiations.
- Ensure accurate documentation of project scope and procedures in the request for proposals and contract.
- Include environmental commitments in the request for proposals and contract.
- Co-locate the design and right-of-way teams to facilitate coordination and communication.

Feedback from participants in the NCHRP Project 20-84 survey and follow-up interviews was consistent with these recommendations, particularly in relation to earlier participation of right-of-way personnel in project development.

2010 Business Relocation Assistance Retrospective Study

In 2010, FHWA conducted a study of business relocation costs (*13*). A primary focus of the research was to determine costs that a business incurs that would be reimbursable if there were no limits in reestablishment expense payments. The research included a literature review of studies conducted from 1996 to 2006, a survey of state DOTs, a review of sample documentation from eight state DOTs, and a survey of businesses that underwent relocation as part of transportation projects in these states. Recommendations from the study included the following:

- Increase the maximum reestablishment expense payment, considering that actual reestablishment costs for most businesses far exceed the maximum amount allowed.
- Increase the amount of fixed payments for non-residential moves, including refining the definition of net income.
- Improve advisory services provided to business owners and operators.
- Simplify the relocation process (e.g., by making the search expense payment a lump-sum payment that a business could claim without documenting time and actual costs incurred, and by approving moving cost estimates up to $10,000 by agency personnel).

2012 FHWA Study on Coordination with Railroads for the Acquisition of Real Property

In 2012, FHWA completed a study to explore ways that state DOTs could expedite the execution of access agreements and acquisition of real property from railroads (*14*). As a case study, the research focused on the northeastern United States, specifically states through which Amtrak operates its Northeast Corridor trains. The research revealed significant issues related to indemnification, assignment of environmental and other risks, related financial payments, state rights versus federal government rights, and coordination. Recommendations to address these issues included the following:

- Negotiate MOUs with Amtrak, outlining how to conduct the review process, including deadlines and realistic expectations and timeframes for review and approval.
- Meet with Amtrak at least annually to review the process and discuss upcoming projects.
- Establish early coordination with Amtrak while projects are still in the conceptual phase, and meet on a regular basis to discuss the status of projects and agreements.
- Utilize staff who are knowledgeable about railroad operational requirements to avoid developing concepts that the railroad would find unacceptable.
- Establish a system for tracking project progress.
- Explore the feasibility of revising existing regulations to reimburse state DOTs for Amtrak's environmental risk fee.
- Update limits and requirements for liability insurance in the federal regulations to eliminate the need for case-by-case federal exemptions to pay the higher limits.
- Fund research on the status of Amtrak relative to the states' power of eminent domain.

Real Property Data Modeling Trends

State DOTs use a variety of data and document management approaches to support right-of-way functions (*15, 16, 18, 19*). Typically, agencies manage real property through a combination of paper records, spreadsheets, various engineering software systems, desktop databases, and custom-built applications. As a reference, Table 2 provides a compilation of databases and systems that was assembled as part of NCHRP Project 08-55A.

In most cases, a unique ID identifies a parcel, which may be unique within a project but not necessarily unique across the enterprise. For visualization purposes, some state DOTs generate shaded areas or shapes within their CAD environment to highlight the location of the parcels they are acquiring. However, this is not a generalized practice. In some cases, agencies maintain electronic copies of those shaded areas or shapes, but in general, these elements are not included in as-built drawings or official engineering records. The official parcel record is still the deed and other supporting documents such as survey plats and property descriptions that an authoritative agency maintains.

State DOTs are beginning to explore the use of geospatial platforms to develop or maintain real property inventories. However, a generalized or universally accepted data model does not exist for the inventory of these assets. At the federal level, the National Integrated Land System (NILS) is a Public Land Survey System (PLSS)-based land management

Table 2. Right-of-way management systems compiled as part of NCHRP Project 08-55A (adapted from [*17*]).

Agency/State	System	Acronym	Primary Functional Areas of Application
Alabama	Comprehensive Project Management System	CPMS	Project status, right-of-way mapping, appraisal status, acquisition, relocation, leased property
California	Right-of-Way Management Information System	ROWMIS	Highway projects; parcel acquisitions
Connecticut	Image Records Management System	IRMS	Document management for right-of-way documents and maps
Florida	Outdoor Advertising Inventory Management System	ODAIMS	Outdoor advertising signs regulation
Florida	Right-of-Way Management System	RWMS	Most functional areas of real property
Indiana	Land Record System	LRS	Land records; status of each parcel
Louisiana	Appraisal, Acquisition, and Relocation System	AARS	Appraisal, acquisition, and relocation
Maryland	Office of Real Estate Management System	OREMS	Acquisition
Michigan	Real Estate Management Information System	REMIS	Most functional areas of right-of-way
Minnesota	Right-of-Way Electronic Acquisition Land Management System	REALMS	Right-of-way acquisition, land management
Mississippi	Parcel Tracking System	PTS	Full range of right-of-way activities
Missouri	Realty Asset Inventory Management System	RAI	Realty assets, sales, leases, and excess properties
Nebraska	Automated Right-of-Way Management System	ARMS	Appraisal; negotiation (partial)
Nevada	Integrated Right-of-Way Information Network	IRWIN	Property acquisition and property management
Oregon	Right-of-Way Data Management System	RWDMS	Enterprise content management for right-of-way processes
Pennsylvania	Right-of-Way Office Information System	ROWIS	Appraisal, acquisition, relocation, property management
Texas	Right-of-Way Information System	ROWIS	Project setup, mapping, funding, appraisal, negotiations, eminent domain
Virginia	Right-of-Way Utilities Management System	RUMS	Most functional areas of right-of-way
Wisconsin	Transportation Utility and Management System	TUMS	Correspondences between offices
Wisconsin	Highway Access Management System	HAMS	Driveway permits and land division reviews
Wisconsin	Real Estate Automated Data System	READS	Most functional areas of right-of-way

system for the collection, management, and sharing of survey data, cadastral data, and land record data, which involves the United States Department of the Interior's Bureau of Land Management (BLM) and other stakeholders (*20*). NILS includes a PLSS data model and four software modules: Survey Management, Measurement Management, Parcel Management, and GeoCommunicator.

The Federal Geographic Data Committee (FGDC) Cadastral Data Content Standard provides semantic definitions of objects related to land surveying, land records, and landownership information (*21*). The model provides feature and attribute definitions for elements such as cadastral data, parcels, rights and interests, and restrictions. The model treats parcels as spatial data elements, whereas rights and interests as well as restrictions are non-spatial data elements that affect parcels. The standard includes several logical-level entity-relationship (ER) diagrams that describe entity names and relationships among entities.

A subset of the Cadastral Data Content Standard is the Cadastral National Spatial Data Infrastructure (NSDI), which includes a minimum set of attributes about land parcels to facilitate the distribution of cadastral information (*22*). The Cadastral NSDI has two components: cadastral reference and parcels. The cadastral reference provides elements that are necessary for querying, mapping, and navigation purposes, including information about the survey system used. Parcels may be polygons or points with enough attribute information to link the spatial component to attribute data produced externally.

NCHRP Projects 08-55 and 08-55A

NCHRP Project 08-55 (*16*) and NCHRP Project 08-55A (*17*) were undertaken to identify data elements to include in a spatial data model for a right-of-way information system. The modeling approach was to use a spatial entity to manage

parcels (in the form of spatial cadastral data obtained from the tax assessor's office or equivalent) and a spatial entity to manage highway project alignments (obtained from project alignment and project end data). Non-spatial entities are linked to the parcel and project entities using one-to-many relationships to handle different aspects or activities of the right-of-way management process. For example, the initial parcel review activity includes project ID and parcel ID as the primary key as well as estimated value, complexity, and appraisal requirement as attributes. Likewise, the lease agreement activity includes project ID and parcel ID as the primary key as well as tenant ID, date of lease, term of lease, personal liability insurance, and lease agreement as attributes.

Real Property Asset Management Architecture Study

In 2008, the Texas DOT completed a research project to develop prototype data architecture to facilitate the inventory and management of Texas DOT real property assets (*18*). The research involved a review of real property management practices and the development of a prototype GIS-based real property asset data model. The researchers used a standalone database environment, a standalone GIS environment, and a web-based environment to test the real property asset data model. Figure 1 and Figure 2 show sample views of the web-based environment, which enables the retrieval of feature- and project-related documents using tabular and/or map views. Figure 1 outlines sheet layouts (including project sheets and right-of-way map outlines) for a sample project in the San Antonio area. Figure 2 includes a zoomed-in view that shows parcels and a customized version of the GIS query tool, which displays attribute data, linkages to documents, and metadata for any parcel selected.

Subsequent efforts at Texas DOT focused on the development of scripts to automate the extraction of parcel boundaries in Bentley® MicroStation® and the development of standalone or cloud-based parcel visualization tools with simple linkages to other pieces of information such as basic project data or documents (Figure 3, Figure 4). Attempts at using third-party commercial software to extract features were largely unsuccessful. Officials noted that the approach worked efficiently only if the CAD files were clean files. However, it resulted in a very slow process if the CAD files did not use a proper survey-level library, were referenced incorrectly, were not placed in the correct coordinate system

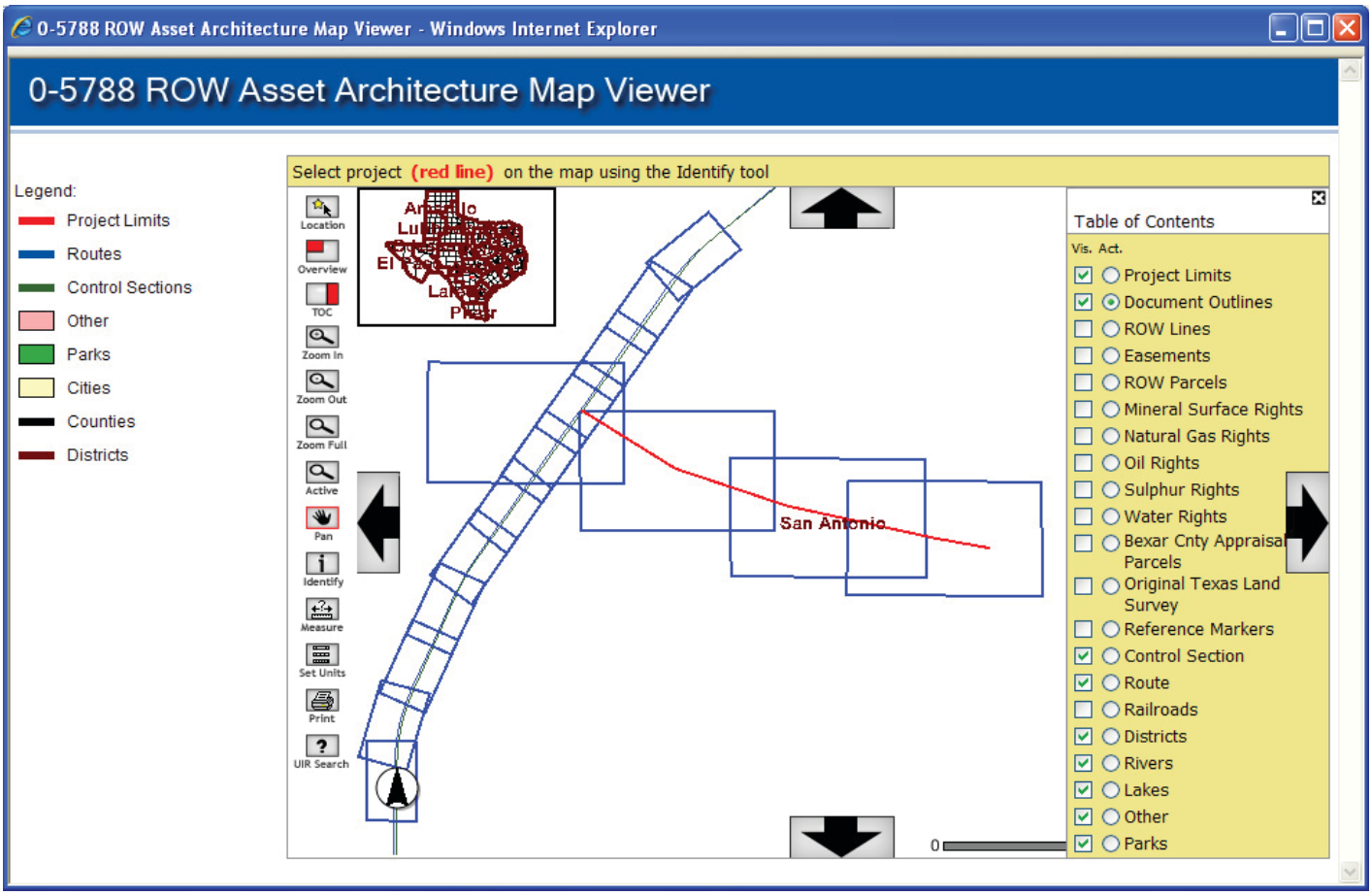


Figure 1. Interactive map viewer—document outline view (18).

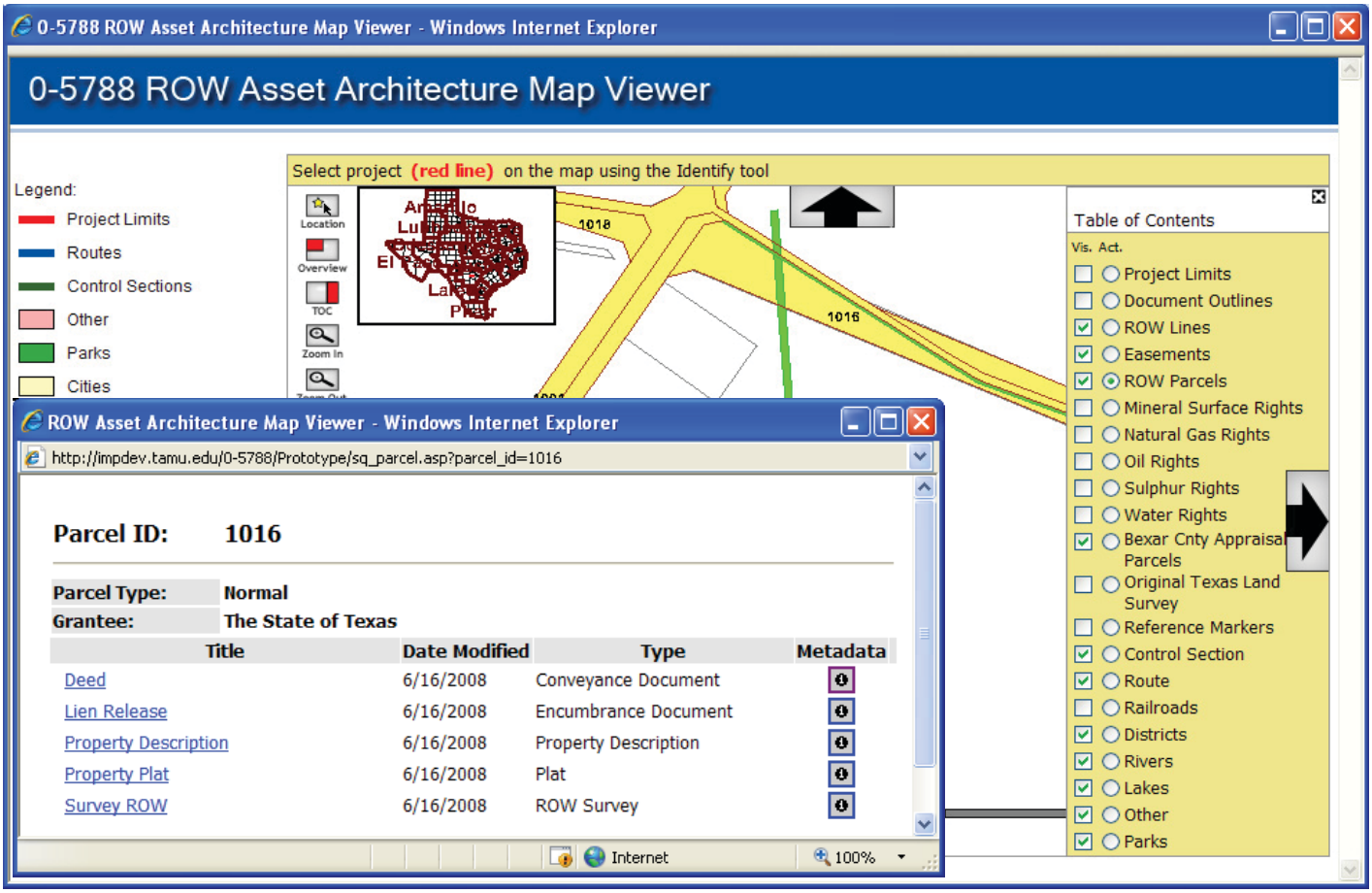


Figure 2. Interactive map viewer—parcel document view (18).

Figure 3. Standalone ArcGIS® tool to visualize parcel acquisition process (23).

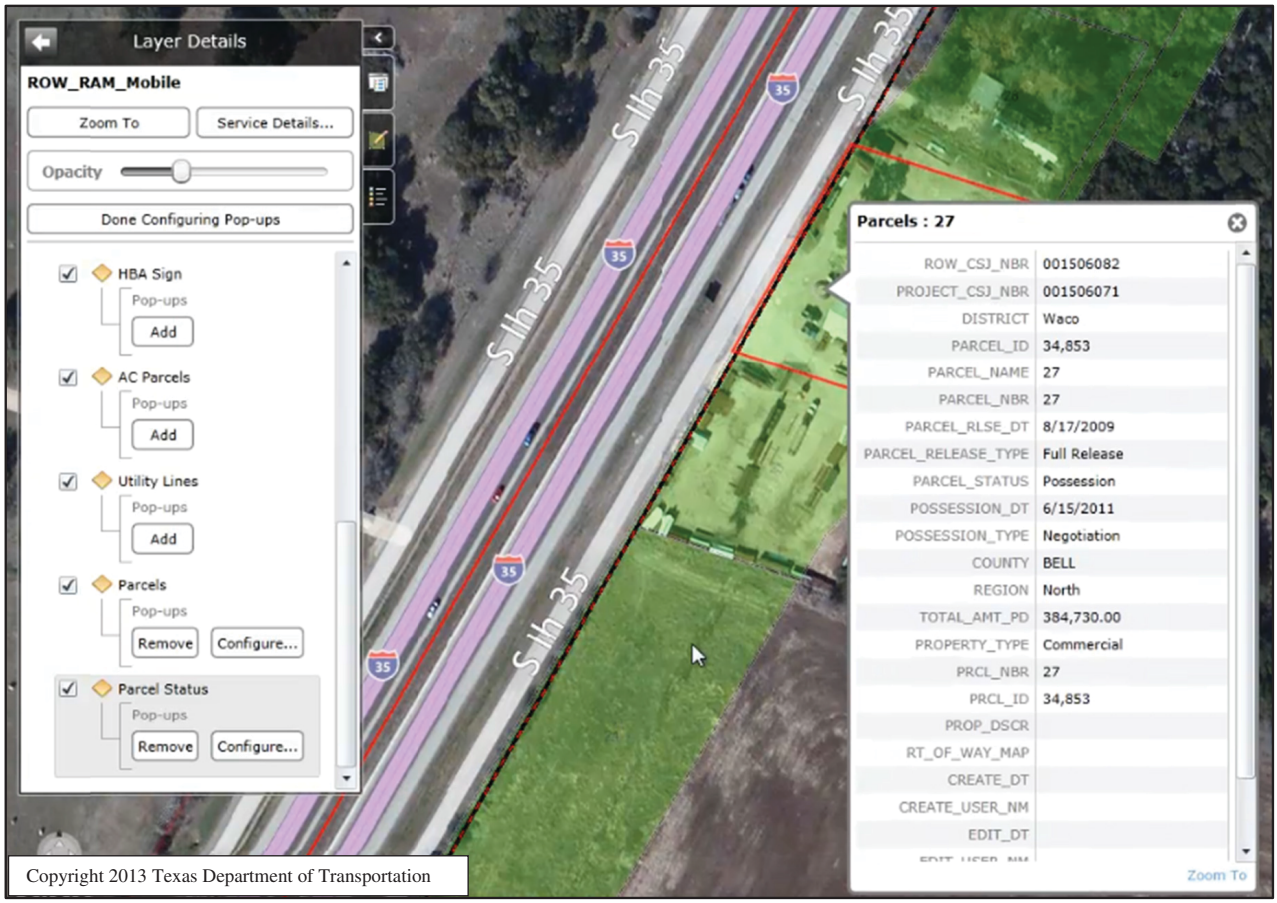


Figure 4. Online tool to visualize parcel acquisition process (24).

before processing, or contained line work that did not close properly to form polygons.

Because of these difficulties, officials concluded that a manual approach to generate parcel polygons was at least as efficient as using a script-based procedure, with the advantage that the operator could achieve more predictable results when processing parcels manually. Nonetheless, officials noted the following limitations of the manual approach:

- It is difficult to determine the shape of the line work elements that compose a parcel polygon.
- It is necessary to import many components into the GIS manually to determine precise boundaries.
- It is necessary to allow for additional processing time when dealing with curves.

Visualization Techniques for Real Property Acquisition

In 2011, FHWA completed a report summarizing the ways state DOTs have used computer-based visualization techniques to facilitate the acquisition of real property for transportation projects (*25*). The report also outlined barriers preventing the implementation of visualization techniques as well as recommendations to address those barriers. Motivation for the report was the result of a 2009 survey of state agencies by AASHTO indicating that use of visualization techniques to support real property activities was less prevalent than for other project development and delivery areas at state DOTs. The 2009 survey was a follow-up to a 2006 domestic scan on right-of-way and utilities (*26*) and the 2008 international scan on right-of-way and utilities (*10*), which reported on the use of three-dimensional (3D) animations to communicate real property requirements and impacts to property owners and relevant stakeholders to help avoid or mitigate the costs of condemnation proceedings.

Although discussions about visualization techniques usually involve the use of 3D animations, the range of visualization techniques is quite broad. Depending on the need, it may be possible to develop two-dimensional (2D) models, 3D models, and four-dimensional (4D) models (i.e., 3D models plus time, where the time component enables the development of views or animations that describe a specific business process) (*27*). Five-dimensional (5D) models (i.e., 3D data plus time and cost) and six-dimensional (6D) models (i.e., 3D and project lifecycle management data) are also possible. In recent years, considerable discussion has focused on using building information modeling (BIM) techniques

to develop digital representations of the physical and functional characteristics of a facility. As opposed to traditional 3D modeling, BIM involves representing the components of a facility as individual objects that have geometry, attributes, and relationship characteristics (*28*).

The results of the 2011 FHWA report indicate that the type of visualization techniques used for acquiring real property varies greatly among agencies. The most common technique involves using 2D drawings, with or without an aerial imagery background. Agencies also use applications such as Google Earth®. Agencies find 2D drawings to be a cost-effective tool to support straightforward real property acquisitions. However, a common complaint from property owners is that traditional 2D drawings are just lines on paper that are difficult to understand. Agencies tend to justify more advanced visualization techniques for large, complicated real property acquisitions. Problematic acquisitions can also benefit from the use of advanced visualization techniques, but the effectiveness may be questionable because problematic acquisitions are often not identified as such until the end of the acquisition process.

Benefits of using advanced visualization techniques include a more effective communication of project impacts to property owners and other stakeholders as well as fewer errors and more effective project coordination. State DOTs also indicated opportunities for a more effective determination of the amount of real property to be acquired and a potential reduction in the number of acquisitions going to condemnation. At the same time, agencies noted barriers preventing the implementation of visualization techniques, such as a lack of awareness about how to use visualization techniques to assist with the acquisition of real property and a perception that visualization techniques are costly to produce and thus are only useful for a small number of large projects. Agencies also noted a lack of internal resources, including funding and personnel with expertise in developing visualizations, and concern that visualizations might not look exactly like the actual project (potentially raising the issue of liability for the agency).

Recommendations for implementation included the following:

- Reach out to visualization staff within the agency to learn about visualization techniques that may be available to support the acquisition of real property.
- Use visualizations to supplement, not replace, existing practices or tools.
- Spread the cost of developing visualization materials among several units within the agency.
- Develop a standard process to evaluate the effectiveness of using visualizations for real property acquisitions.
- Promote the use of portable electronic devices such as laptops, tablets, and mobile phones to assist with the demonstration of visualizations to property owners.
- Use visualizations for the appropriate purpose, striking a balance between stakeholder expectations and the level of visualization sophistication actually needed.
- Determine the degree to which visualizations can accelerate the acquisition of real property.
- Create guidelines and contract templates for the development of visualization products, taking into account the needs of various stakeholders within the agency (e.g., planners, designers, traffic engineers, and real property), including requirements for visualization complexity and other requirements such as preparing for and testifying in court. The guidelines and templates should also take into account specific types of data that visualization contractors might require, ranging from roadway alignments and geometry to digital terrain models (DTMs), striping plans, grading plans, and traffic counts.

2012 Property Management Tools and Techniques Study

In 2012, FHWA scheduled three regional roundtables with 11 state DOTs to discuss property management issues and strategies to overcome those issues (*29*). The focus of the roundtables was the use of information systems to support property management workflows. The range in practices in this area is quite wide, from state DOTs that have highly functional computerized systems to state DOTs that rely on manual methods or spreadsheet tools. Regardless of approach or implementation level, agencies face very similar challenges, including (a) property inventories that are user unfriendly or too old to allow for expedited updating procedures, and (b) lack of integration with geospatial tools at the agency. Feedback from the 11 participating state DOTs resulted in the following requirements for developing a model property management system:

- Functional requirements:
  - Inclusion of feedback from other units within the agency.
  - Promotion of property sales (e.g., by populating a publicly accessible website dedicated to listing properties that are on the market).
  - Focus on the most appropriate features, including surplus property, utility permits (and milestones in the permitting process), project status (active versus closed), cell phone tower leases, and parcel numbers.
  - Notification of encumbrance status and other pertinent information to others.
  - Tracking of Title 23 funding.
- Technical requirements:
  - Linkage to mobile devices.
  - Support for electronic signature and validation.
  - Use of automated forms.

  - Integration with other agency systems, including GIS.
  - Use of data quality protections.
  - Balance between security and ease of use.
  - Clear requirements for consultants.
  - Employment of limited application development duration.
  - Deployment of a limited number of modules at a time.
  - Focus on ease of data entry.
  - Use of a simplified search mechanism.
  - Assurance of adequate query and reporting capabilities.
  - Support for printing capabilities.
  - Assurance of adequate computing power.
- Other requirements:
  - Frequent assessment of data field needs.
  - Use of dedicated staff.

Prototype Platform and Recommendations for Managing Real Property Data at the Florida DOT

In 2013, the Florida DOT completed a research project to develop recommendations to improve the management of real property and utility data at the department (*19*). The research included a comprehensive review of MicroStation design libraries in use at the department and a determination on how to apply this information to the development of a data model and protocol for the extraction of real property and utility data from MicroStation into an ESRI® ArcGIS® environment. The review of MicroStation design libraries revealed the use of graphical elements (mainly property lines and existing and proposed right-of-way lines) to depict real property being acquired (Figure 5). Although useful for developing design files in MicroStation, this practice makes it more difficult to determine the boundaries of parcels on design files, especially for stakeholders who may not be familiar with Florida DOT design files or CAD standards. It also makes it difficult to extract features into a GIS environment in a systematic way. Closed polygons would be useful to address this problem (Figure 6). However, there was not a dedicated polygon or shape parcel level in the MicroStation design libraries.

The research team considered several options to identify and merge parcel boundaries to create polygons, including generating parcel shapes in ArcGIS, generating parcel shapes in MicroStation using features from the right-of-way file, and generating parcel shapes in MicroStation using Bentley GEOPAK® data. A major advantage of the third approach is that the Florida DOT already collects and processes field survey data in GEOPAK, and department personnel are familiar with it. The software environment already contains all the functions to generate parcel polygons, but a missing piece was a systematic protocol for district personnel because current Florida DOT protocol does not require the use of parcel polygons within MicroStation. As a result, the research team developed a generalized protocol to develop parcel shapes in MicroStation, which included adding the following real property shape levels to the right-of-way design library: fee simple, easements, leases, licenses, and condominium units. Other real property levels could be added during implementation. The research team also produced recommendations on how to remove inconsistencies in the naming of standard MicroStation levels.

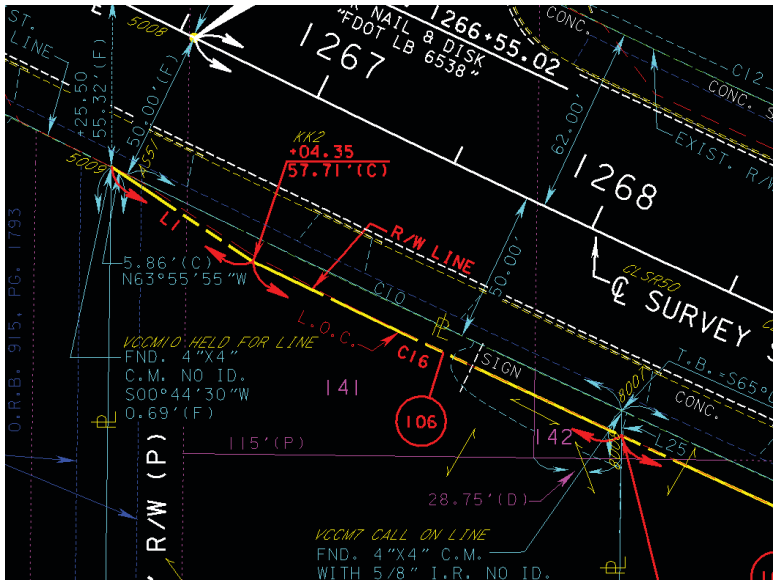


Figure 5. Sample Florida DOT design drawing with property parcels (19).

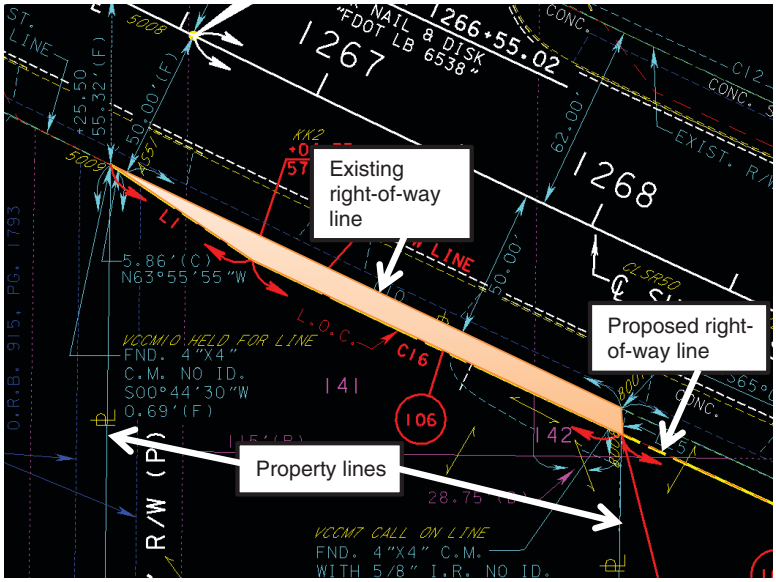


Figure 6. Boundary of Property Parcel 106 in Florida DOT sample design drawing (19).

CHAPTER 3

Integrated Transportation Project Development and Delivery Process Modeling

Introduction

This chapter summarizes the work completed to identify existing project development and delivery workflows and develop a reference (or typical) model of the transportation project development and delivery process at state DOTs. The chapter outlines different approaches to visualize the process and describes a generic model based on a review of processes and documentation at most state DOTs around the country.

This chapter also summarizes the work completed to develop a real property acquisition and relocation assistance model in accordance with the requirements in the Uniform Act (42 U.S.C. 4601 et seq.). The chapter outlines the methodology followed to develop the model and describes each existing property acquisition and relocation assistance procedure and business practice without constraints from existing regulations.

To provide a proper context to the analysis, the chapter describes the existing transportation project development and delivery process while highlighting components of the process that (a) represent, (b) are needed to support, or (c) require a direct, major output from real property acquisition and relocation assistance activities.

Although the generic models described in this chapter are intended to represent typical conditions, the models incorporate a few suggestions from stakeholders (as well as lessons learned from prior research and implementation work carried out by members of the research team) regarding best practices for project development and delivery. Examples of these best practices include depicting project management as an activity that spans project development and delivery; starting the design phase with a significant level of project definition; and conducting design, utility coordination and relocation, and real property acquisition in parallel as opposed to sequentially.

Traditional Approaches to Visualize the Process

Varied representations of the transportation project development and delivery process appear in the literature. For example, Figure 7 shows a depiction of the process according to the FHWA *Real Estate Acquisition Guide for Local Public Agencies* (*30*). This depiction shows a linear process that starts with a planning phase followed by a phase in which project impacts are analyzed, a design phase that involves the development of project specifications, and finally, phases involving real property acquisition and then construction. The LPA guide refers to the entire process from planning to construction as the "project development process" (i.e., it does not distinguish "development" from "delivery").

The description of the process written in the LPA guide assumes the following phases and activities:

- **Planning.** This phase includes all activities to prioritize projects based on needs and funding capabilities. The guide shows environmental coordination and public involvement as components of the planning phase.
- **Typical project development cycle.** This phase includes the following high-level activities:
  - Project alternative development.
  - Hazardous material and contaminant evaluation.
  - Environmental assessment (EA).
  - Public involvement.
  - Alignment selection.
  - Project design.
  - Utilities.
  - Right-of-way plans.
  - Acquisition.
  - Right-of-way certification.

The LPA guide's characterization of the project development and delivery process has limitations, including a linear

Figure 7. Project development and delivery process according to the* LPA Real Estate Acquisition Guide *(adapted from [30]). Courtesy of FHWA.

graphical representation of the process with no overlap between phases and a lack of correspondence between the graphical representation of the process and the written description of activities. In the specific case of real property acquisition, the process shown in Figure 7 suggests that this activity takes place after completing the design and project specifications. However, the written description of activities indicates that acquisition can start after completing activities such as the environmental analysis and developing right-of-way plans.

Figure 8 depicts the process described in the 1997 FHWA publication *Flexibility in Highway Design* (*31*). This depiction is similar to that shown in Figure 7, except that it acknowledges the possibility of overlap between phases and activities. This report highlights that considerable overlap occurs in terms of coordination among the various disciplines that work on a project. The report refers to the entire process from planning to construction as "planning and development." The report also refers to "project development" (in Figure 8) as "preliminary design."

The written description of the process in this FHWA report assumes the following phases and activities:

- **Planning.** This phase includes all activities to prioritize projects based on needs and funding capabilities. The report recognizes planning at three levels of government: state, regional, and local.
- **Project development.** This phase, which is heavily influenced by the environmental review process, includes the following high-level activities:
  - Refine the project purpose and need.
  - Develop project alternatives.
  - Evaluate alternatives and the impact on the natural and built environments.
  - Develop appropriate mitigation.
- **Final design.** This phase involves the development of a complete set of plans, specifications, and estimates (PS&E) of required quantities of materials after a preferred alternative has been selected and agreement exists on the project description as stated in the environmental document. Completing the design involves the following activities:
  - Develop a design concept to provide focus to the design phase.
  - Develop a detailed design.
- **Right-of-way acquisition.** The 1997 FHWA report assumes that real property acquisition takes place after completing the project design.
- **Construction.**

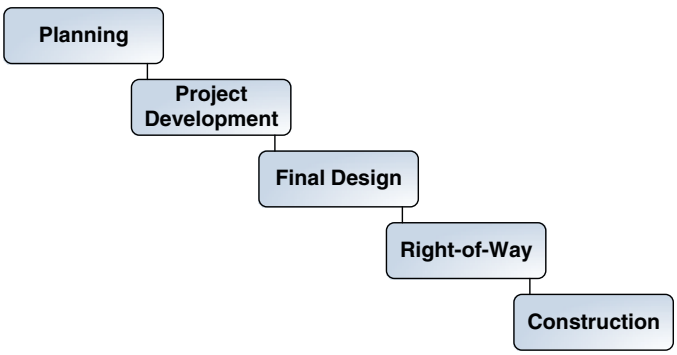


Figure 8. Project development and delivery process according to FHWA's* Flexibility in Highway Design *(adapted from [31]). Courtesy of FHWA.

Figure 9 depicts the process according to the 2004 AASHTO publication *A Guide for Achieving Flexibility in Highway Design* (*32*). This depiction assumes the following project development stages:

- **Concept definition.** This phase includes all activities needed to define the project, including determinations of need, geographic limits, and other information required for studies to begin.
- **Planning and alternatives development.** This phase includes all activities that result in the selection of a preferred plan that meets regulatory requirements. This phase includes the environmental review process, although the diagram does not explicitly include a box to cover environmental review activities.
- **Preliminary design.** This phase follows the acceptance of the preferred plan after considering all the alternatives. It involves developing the geometric elements of the project to establish their impact as well as identifying real property, utility, and construction requirements. This phase includes preparing documentation of relevant design requirements.
- **Final design.** This phase involves the completion of design documents, construction specifications, and cost estimates.

The AASHTO publication considers the construction and maintenance phases to be post project development. Notice that the process depicted in Figure 9 is fairly linear and only accepts the possibility of activity overlap within phases. The

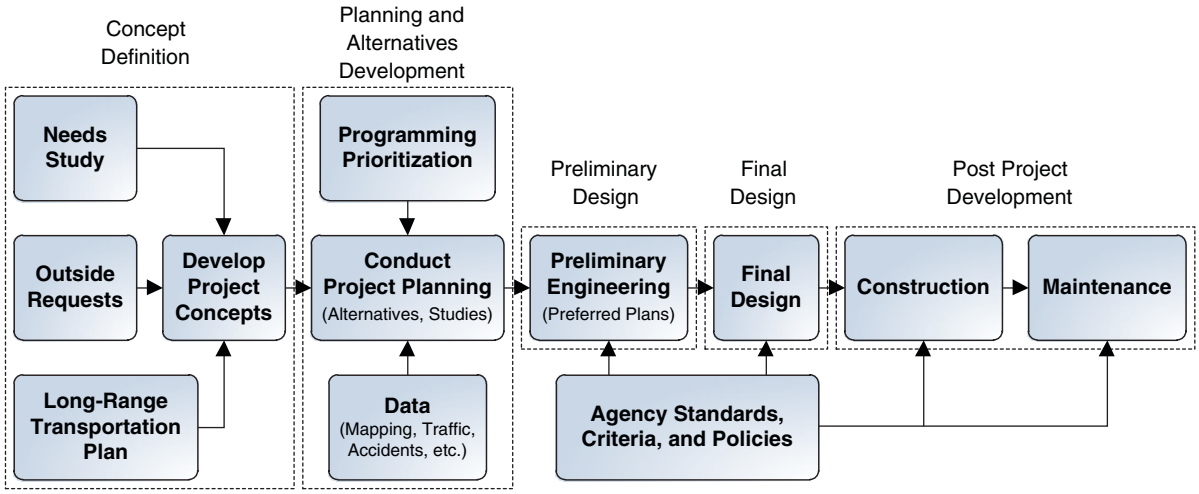


Figure 9. Project development and delivery process according to AASHTO's* A Guide for Achieving Flexibility in Highway Design *(adapted from [32]).

model also does not provide an explicit representation of individual functions (e.g., real property acquisition or environmental review) within the process. Nonetheless, the model is a useful reference because, as documented in the following section, it contains many elements found in current practice at state DOTs throughout the country.

Representation of the Process at State Agencies

This section summarizes the result of a review of available documentation at state DOTs that was conducted to develop an understanding of the way state DOTs visualize and manage their project development and delivery process. The literature search consisted of an online search of documentation available on state DOT websites, which was complemented by emails and phone calls to gather additional documentation when the online search was not sufficient.

The search was intended to develop an understanding of typical practices, not to develop a detailed or comprehensive inventory of processes, which was beyond the scope of the research project. Table 3 summarizes the results of the literature search, which produced the following results:

- State DOT organization chart: 45 states.
- Right-of-way division (or headquarters equivalent function) organization chart: 8 states.
- Project development process manual (or equivalent): 37 states.
- Project development process diagram: 35 states.
- Right-of-way process diagram: 16 states.
- Right-of-way manual (standalone or included in another manual): 42 states.
- Utility manual (standalone or included in another manual): 32 states.

Information about utility manuals was relevant to document utility relocation practices as they pertain to provisions in the Uniform Act and 49 CFR 24, not in connection with the identification and management of utility conflicts and other utility coordination topics (which were outside the scope of this research).

A high-level review of the documentation gathered led to the following observations:

- There are many similarities in the ways state DOTs visualize and manage their transportation project development and delivery process. This is not surprising given the high level of standardization that has resulted from decades of implementation of federal laws, regulations, and policies, as well as outreach and dissemination by organizations such as FHWA or AASHTO. The next section of this chapter describes a generic reference (or typical) model of the transportation project development and delivery process that draws on the similarities found in state practices.
- Despite the similarities, however, state DOTs have developed a wide range of unique variations to conceptualize and manage their transportation project development and delivery process. This also is not surprising given the wide range in local and regional conditions, as well as in legal, political, and administrative processes, that state DOTs face when developing transportation projects. Therefore, along with the reference (or typical) model of the process, the next section of this chapter provides a few examples of variations in process among state DOTs.
- State DOTs use a variety of ways to visualize and document their process, including diagrams, reports, guides, and manuals. Examples of diagrams include workflow diagrams, Gantt charts, cross-functional (e.g., swim lane) diagrams, and organization charts. The level of detail in the written documentation also varies substantially, from

Table 3. Documentation gathered on project development process.

State	Organization Chart Available?		Project Dev. Process Manual Available?	Process Diagrams Available?		Right-of-Way Manual Available?		Utility Manual Available?	
	State DOT	Right-of-Way		Project Dev. Process	Right-of-Way Process	Standalone	In Another Manual	Standalone	In Another Manual
Alaska	Y		Y	Y		Y		Y	
Alabama	Y		Y	Y		Y		Y	
Arkansas	Y					Y		Y	
Arizona	Y	Y				Y			
California	Y		Y	Y	Y	Y			In Right-of-Way Manual
Colorado	Y		Y		Y	Y		Y	
Connecticut	Y		Y					Y	
District of Columbia	Y		In Design Engineering Manual				In Design Engineering Manual		In Design Engineering Manual
Delaware	Y		Y			Y		Y	
Florida	Y		Y	Y	Y	Y		Y	
Georgia	Y		Y	Y	Y	Y		Y	
Hawaii	Y								
Iowa	Y			Y	Y	Y			
Idaho	Y		Y	Y	Y	Y		Y	
Illinois	Y		In Design Engineering Manual	In Design and Environmental Manual	In Design and Environmental Manual	Y			In Design and Environmental Manual
Indiana	Y		In Design Manual	Y		Y			
Kansas				Y				Y	
Kentucky	Y			Overview		Y			
Louisiana	Y					Y			
Massachusetts	Y	Y	Y	Y	Y	Y			
Maryland			Y	Y		Y		Y	
Maine	Y		In Highway Design Guide	In Highway Design Guide		Y			
Michigan	Y								
Minnesota	Y	Y			Y	Y			
Missouri	Y			Y	Y	Y			
Mississippi	Y		Y, for LPAs		Y	Y, for LPAs			
Montana	Y		Y	Y		Y			In Right-of-Way Operations Manual
North Carolina	Y		Y	Y			In Policy and Procedure Manual	Y	
North Dakota	Y		Y		Y	Y		Y	
Nebraska						Y			

New Hampshire			In Highway Design Manual	In Highway Design Manual			In Highway Design Manual		In Highway Design Manual
New Jersey	Y			Y		Y			
New Mexico			Y	Y					
Nevada	Y		Y						
New York	Y		Y	Y	Y	Y			
Ohio	Y		Y	Y	Y	Y			In Real Estate Manual
Oklahoma	Y								
Oregon	Y	Y	Y	Y		Y		Y	
Pennsylvania	Y	Y	In Highway Design Manual and Environmental Assessment Handbook	In Highway Design Manual and Environmental Assessment Handbook			In Highway Design Manual		In Highway Design Manual
Rhode Island	Y		Y	In Project Development Manual			In Project Development Manual		In Project Development Manual
South Carolina	Y		Y	Y				Y	
South Dakota	Y		In Road Design Manual				In Road Design Manual		
Tennessee	Y		In LPA Guidelines	Y		Y		Y	In LPA Guidelines
Texas	Y	Y	Y	Y	Y	Y		Y	
Utah	Y	Y	Y	Y	Y	Y			
Virginia	Y	Y	Y	Y		Y			
Vermont	Y		Y	Y				Y	
Washington	Y		Y	Y		Y		Y	
Wisconsin	Y		In Facilities Development Manual	Y		Y		Y	Y
West Virginia				Y			In Design Directives	Y	
Wyoming	Y		Y	Y			Y		
Total	**45**	**8**	**37**	**35**	**16**	**34**	**8**	**22**	**10**

highly detailed prescriptive descriptions to brief documents that focus primarily on milestones but provide little information about the process. An increasing number of states are automating the visualization and documentation of their process (e.g., by using scheduling software to develop typical or project-specific timeline views of the process).

- State DOTs use a variety of terms to refer to similar processes or phases of activities. For example, the term "right-of-way authorization" in New Jersey is similar to the "right-of-way release" in Texas, "authorize right-of-way" in Virginia, and "authorization to acquire right-of-way" in Vermont. Similarly, the term "preliminary design" in New Jersey and Texas is similar to "initial/preliminary roadway design" in Virginia and "conceptual design" in Vermont. Table 4 shows a sample of terminologies used to depict similar processes or phases.
- State DOTs also use similar or identical terms to refer to different phases or activities or to phases and activities that vary in scope. This variability in terminology, scopes, and definitions makes understanding and documenting processes more difficult. Examples of this variability include:
  - The term "project development" means different things in different states. Some states use the term "project development" to describe the entire process from concept to design. Other states include construction in this characterization. Other states use the term "project development" to describe planning, programming, and preliminary engineering (but not design). At least one state uses the term "project delivery" to describe all phases from planning to construction.
  - The term "detailed design" means different things in different states. Some states use the term to describe the activities that take place after the release of the environmental document. Other states divide the design phase (after the release of the environmental document) into design concept and detailed design. However, some states use the term "concept" or "design concept" to refer to activities that other states accomplish earlier in the planning or preliminary engineering phase.
  - Most states use design stages or milestones such as 30 percent, 60 percent, 90 percent, and 100 percent design. Significant agreement exists about the meaning of most of these milestones (e.g., 60 percent design is when most utility coordination activities start after the horizontal and vertical alignments are in place and the drainage design is substantially finished). However, states differ as to the level of design completion at which they hand off the project to the design group. These differing levels of design completion tend to vary significantly according to factors such as project type, needs, requirements, and urgency.

Table 4. Project development process terminology crosswalk.

State	Synonyms for					
	Preliminary Design Phase	Document at the End of the Environmental Process	Authorization to Begin Right-of-Way Acquisition	Design Phase	Milestone in Design Phase	Document at the End of the Design Phase
Maine			Authorize Initiation of Acquisition Negotiations			Right-of-Way Class 1-3 Certificate
Montana		Final Environmental Document				Certificates of Right-of-Way
New Hampshire		Environmental Report				Right-of-Way Certificate
New Jersey	Feasibility Assessment/ Preliminary Design	Approved Environmental Document	Final Design Authorization	Final Design		Right-of-Way Availability
New Mexico		Environmental Clearance				Right-of-Way, Utility, and Railroad Certifications
Ohio		Environmental Clearance		Stage 2 and Stage 3 Design		Certificate of Rights of Way
South Carolina		Environmental Document				Right-of-Way Certification
Texas	Preliminary Design	Environmental Clearance	Right-of-Way Release	Detailed Design	30%, 60%, 90%	Right-of-Way Certification
Virginia	Initial/Preliminary Roadway Design	Environmental Document	Final Notice to Proceed	Detailed/Final Roadway Design	60%, 90%, 100%	Right-of-Way and Utility Certifications
Vermont	Project Definition	NEPA Documentation Approval	Authorization to Acquire Right-of-Way	Project Design	Preliminary, Semifinal, and Final Plan Development	
Wyoming		Environmental Clearance		Final Design		Right-of-Way and Utility Clearances

Generic Project Development and Delivery Process Model

The research team considered a number of business process modeling environments to develop the reference (or typical) model of the transportation project development and delivery process, including Gantt charts, Unified Modeling Language (UML), and Integration Definition (IDEF). After evaluating several modeling alternatives, the research team selected a new modeling environment called Business Process Model and Notation (BPMN), which has gained considerable traction in recent years and is becoming increasingly popular because it relies on simple, intuitive constructs such as swim lanes, activities, and gateways (*33*). Using swim lanes has the advantage that activities associated with specific functions or specialties (e.g., right-of-way or environmental activities) can be grouped together easily while facilitating the development of more detailed, or zoomed-in, views as needed.

The research team developed three levels of models to represent the project development and delivery process. The three levels are as follows:

- **Level 1.** This model provides a high-level depiction of the entire process (Figure 10).
- **Level 2.** This model provides an intermediate-level depiction of the entire process (Figure 11). Detailed partial views of the Level 2 model are provided in Figure 12 through Figure 18.
- **Level 3.** This model provides a detailed depiction of the real property acquisition process according to the Uniform Act without constraints from regulations. Subsequent sections in this chapter describe the Level 3 model, including a general view, zoomed-in views, and a depiction of the relationship between this model and the Level 1 and Level 2 models.

Files containing standalone versions of these models are provided in CRP-CD 154 in Visio 2010 format and in portable document format (PDF).

The models in Figure 10 through Figure 18 depict both phases and functional areas of the traditional design-bid-build project development and delivery method, as follows:

- Phases:
  - Planning.
  - Preliminary design.
  - Detailed design.
  - Letting.
  - Construction.
  - Post-construction.
- Major functional areas:
  - Definition, selection, financing, and scheduling.
  - Alternative analysis and preliminary plans.
  - Environmental process.
  - Design and PS&E assembly.
  - Right-of-way map, authorization to acquire property, property acquisition, and relocation assistance.
  - Property management.
  - Utility conflict analysis, permits, relocation, and reimbursement.
  - Letting.
  - Construction.
  - Project management.

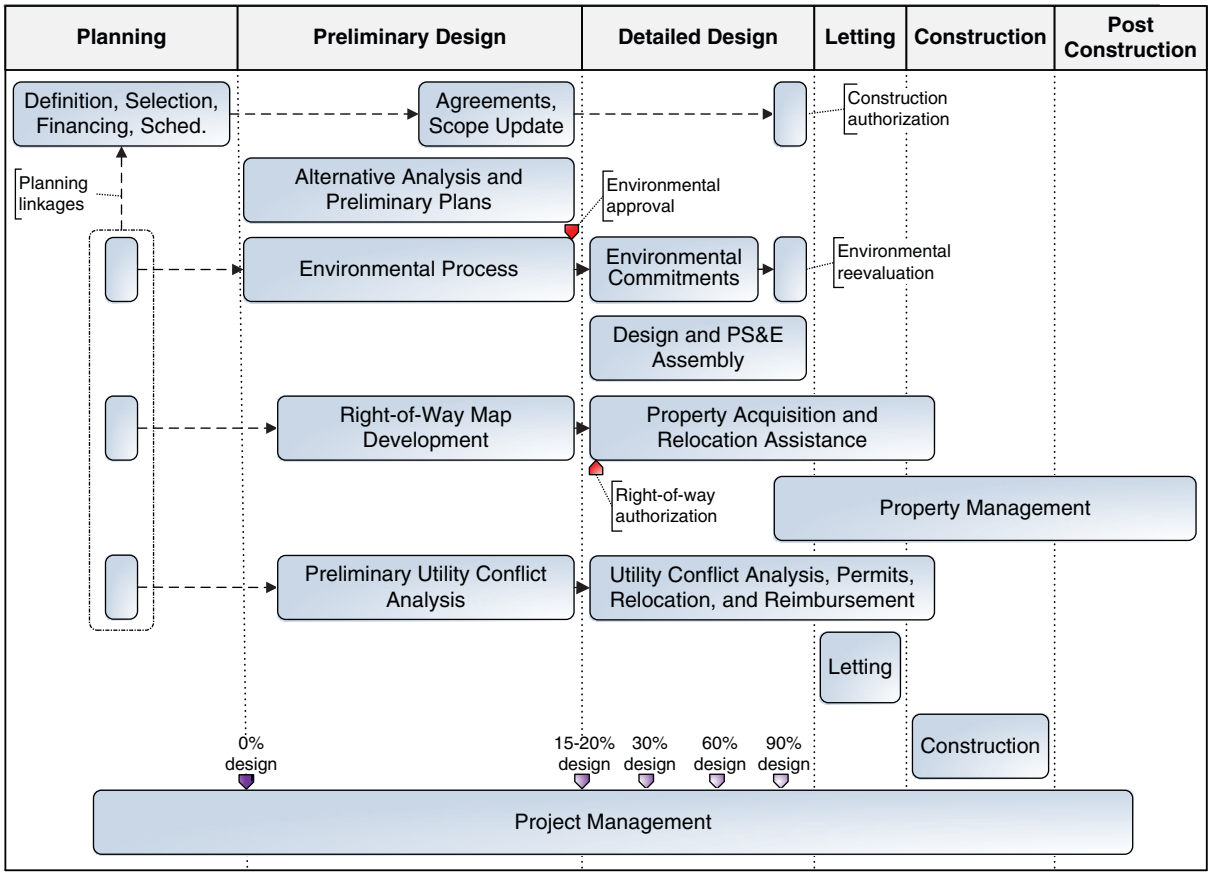
Appendix C of *NCHRP Report 771* contains a detailed description of each process phase and activity.

The models in Figure 10 and Figure 11 correspond to the general case in which a project goes through all phases of development. In reality, the type of project will drive what phases and activities are involved. A commonly used characterization of project types is as follows (*32*):

- **New construction.** New construction projects involve the design and construction of a roadway on a new alignment or major widening or improvement of an existing facility.
- **Reconstruction.** Reconstruction projects frequently involve substantial changes to the horizontal and/or vertical alignment of a road, generally within the currently available right-of-way (although some real property acquisition may be necessary, such as to meet current geometric design standards and criteria for new facilities). Types of improvement under this category include road widening to increase capacity.
- **Resurfacing, restoration, rehabilitation (3R).** 3R projects generally focus on extending the service life of existing facilities, in many cases to enhance safety. Examples of 3R projects include resurfacing, repairing pavement structures and joints, widening minor lanes and shoulders, making minor alterations to horizontal and/or vertical alignments, repairing bridges, and removing or protecting roadside obstacles.
- **Maintenance.** Maintenance projects include actions needed to keep an existing road in good condition. Examples of maintenance projects include repainting pavement markings, removing debris from drainage inlets, repairing surface drainage, and mowing.

Real property impacts are common with new construction or reconstruction projects (i.e., projects that involve a new roadway facility or major changes to an existing highway).

State DOTs use various terms to designate project types, frequently to classify design criteria. For example, the Texas DOT uses the following design criteria categories: preventive maintenance (PM); non-freeway resurfacing or restoration



Note: This diagram is included in CRP-CD 154 in Visio format and PDF.

Figure 10. Typical project development and delivery process (Level 1 model).

(2R); non-freeway rehabilitation (3R); new location and reconstruction (4R); and mobility corridor (5R) (*34*). Some state DOTs (e.g., New York and Wyoming) use the abbreviation 1R instead of PM (*35, 36*).

As mentioned, the models in Figure 10 and Figure 11 depict the traditional design-bid-build project development and delivery method. Other methods could involve different activity sequences. For example, in design-build projects, it is common to hand off the project to a contractor at the beginning of the design phase, and that contractor is responsible for completing the design as well as the actual construction. Figure 19 shows an example of a typical design-build project sequence at the Washington State DOT (*37*). In design-build projects, state DOTs typically retain overall responsibility for real property acquisition, although in some situations, states delegate these activities to the contractor (to the extent possible). Regardless of project delivery method, laws and regulations govern when certain critical activities can take place. For example, real property acquisition generally can begin only after the environmental document has been prepared, reviewed, and approved. Certain exceptions to this rule exist, including flexibilities introduced by the 2012 MAP-21 legislation.

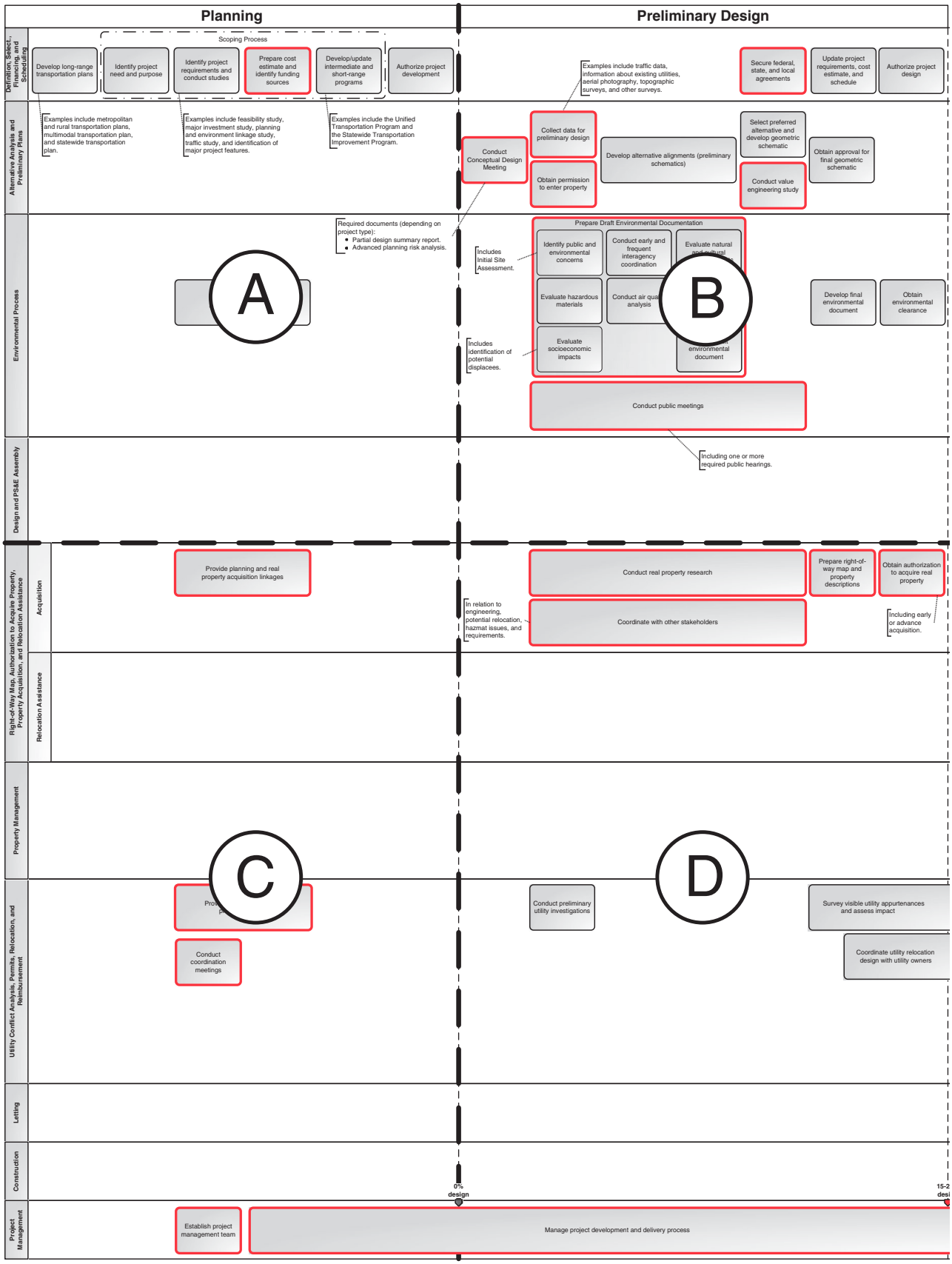
Variations from the Generic Process

The available documentation suggests that many state DOTs follow a project development process essentially as depicted in the previous section of this chapter. However, it is appropriate to discuss a few examples of variations from the generic model to illustrate how different state DOTs have implemented and documented their project development and delivery process.

Florida

The Florida DOT implemented a process called "efficient transportation decision making (ETDM)" that includes an environmental technical advisory team (ETAT) (*38, 39*). Figure 20 provides a graphical depiction of ETDM. The ETAT provides coordination services throughout the entire project development process, including long-range transportation planning, programming, schematic design, and design. The Florida DOT uses the ETDM process for all new capacity projects. Officials carry out ETDM by using an environmental screening tool (EST) to manage an efficient, early interaction with other agencies and the community.

(*text continues on page 44*)



Note: This diagram is included in CRP-CD 154 in Visio format and PDF. Activities with a red outline correspond to activities with a significant real property component. The large circled letters (A–G) correspond to partial views of the model shown in Figure 12 through Figure 18).

Figure 11. Typical project development and delivery process (Level 2 model).

(continued on next page)

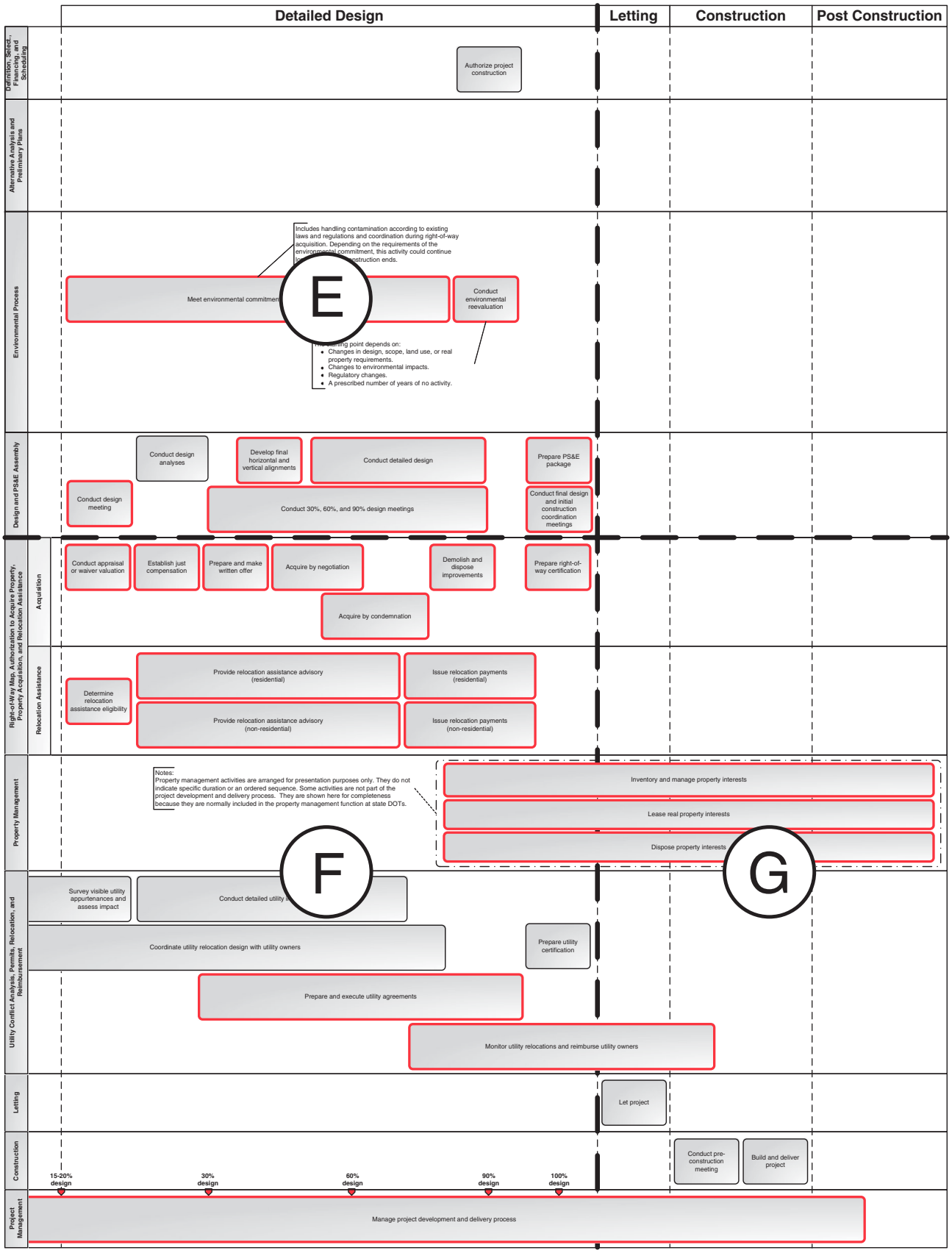


Figure 11. (Continued).

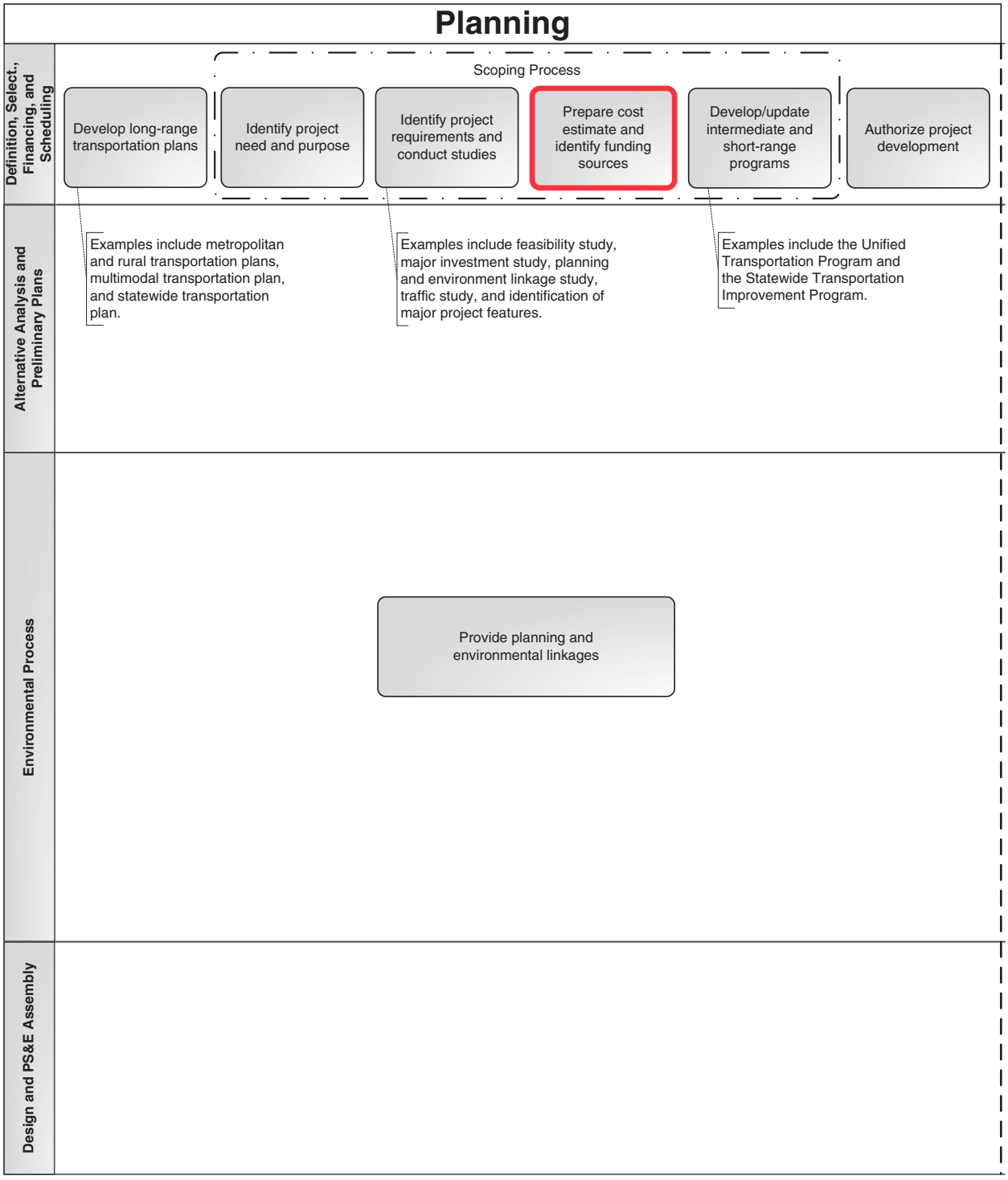


Figure 12. Typical project development and delivery process (Level 2 model)—Part A.

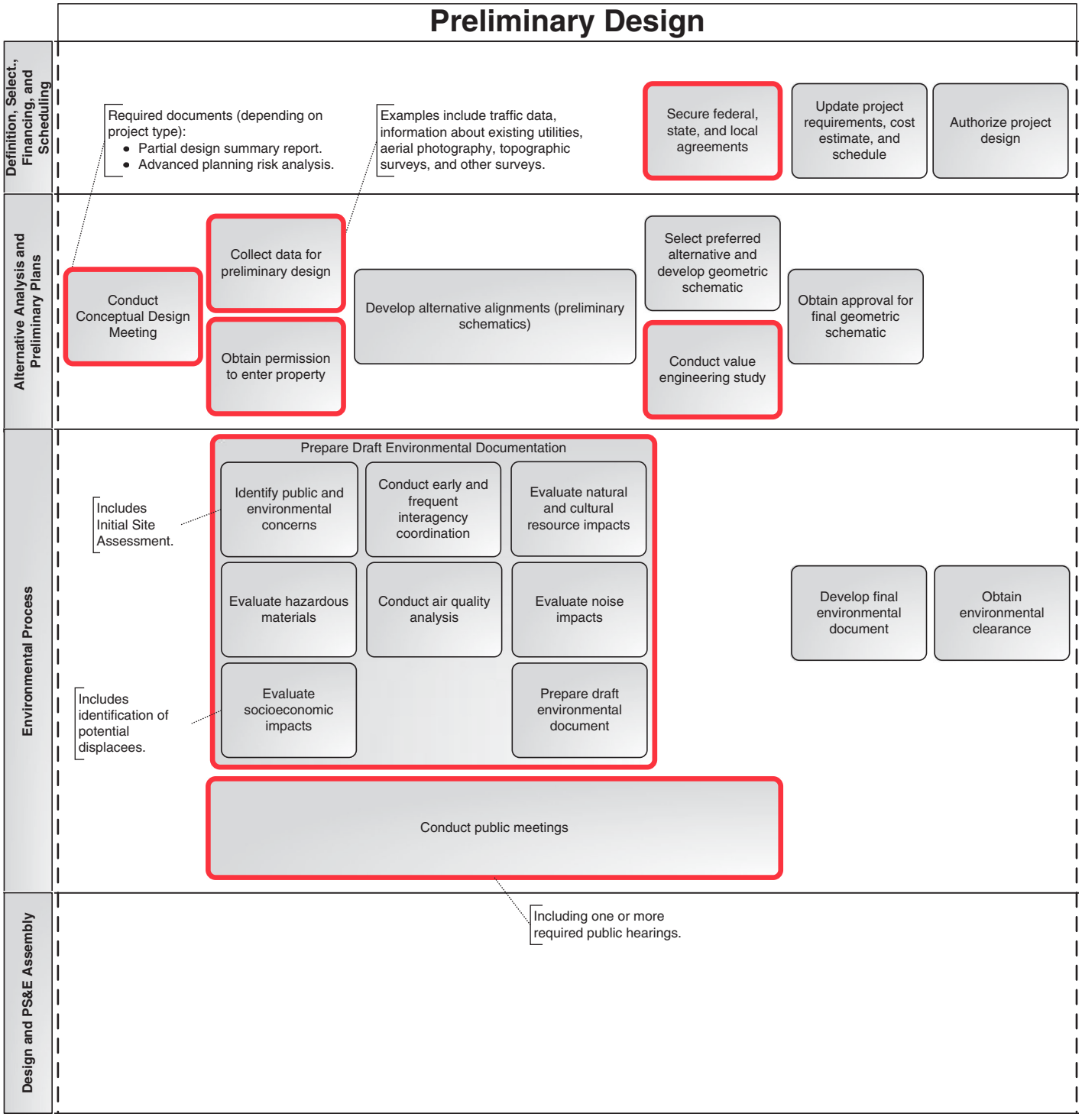


Figure 13. Typical project development and delivery process (Level 2 model)—Part B.

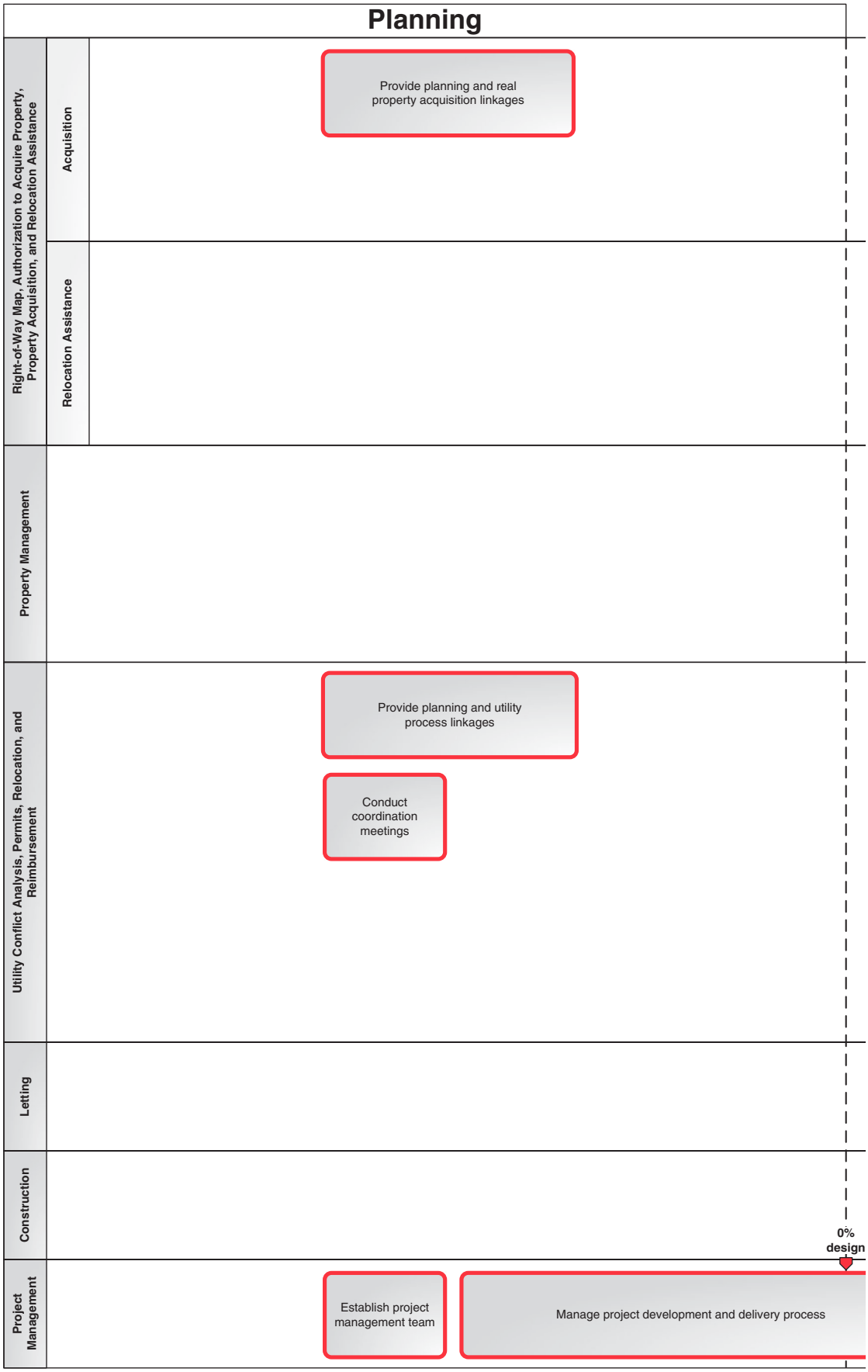


Figure 14. Typical project development and delivery process (Level 2 model)—Part C.

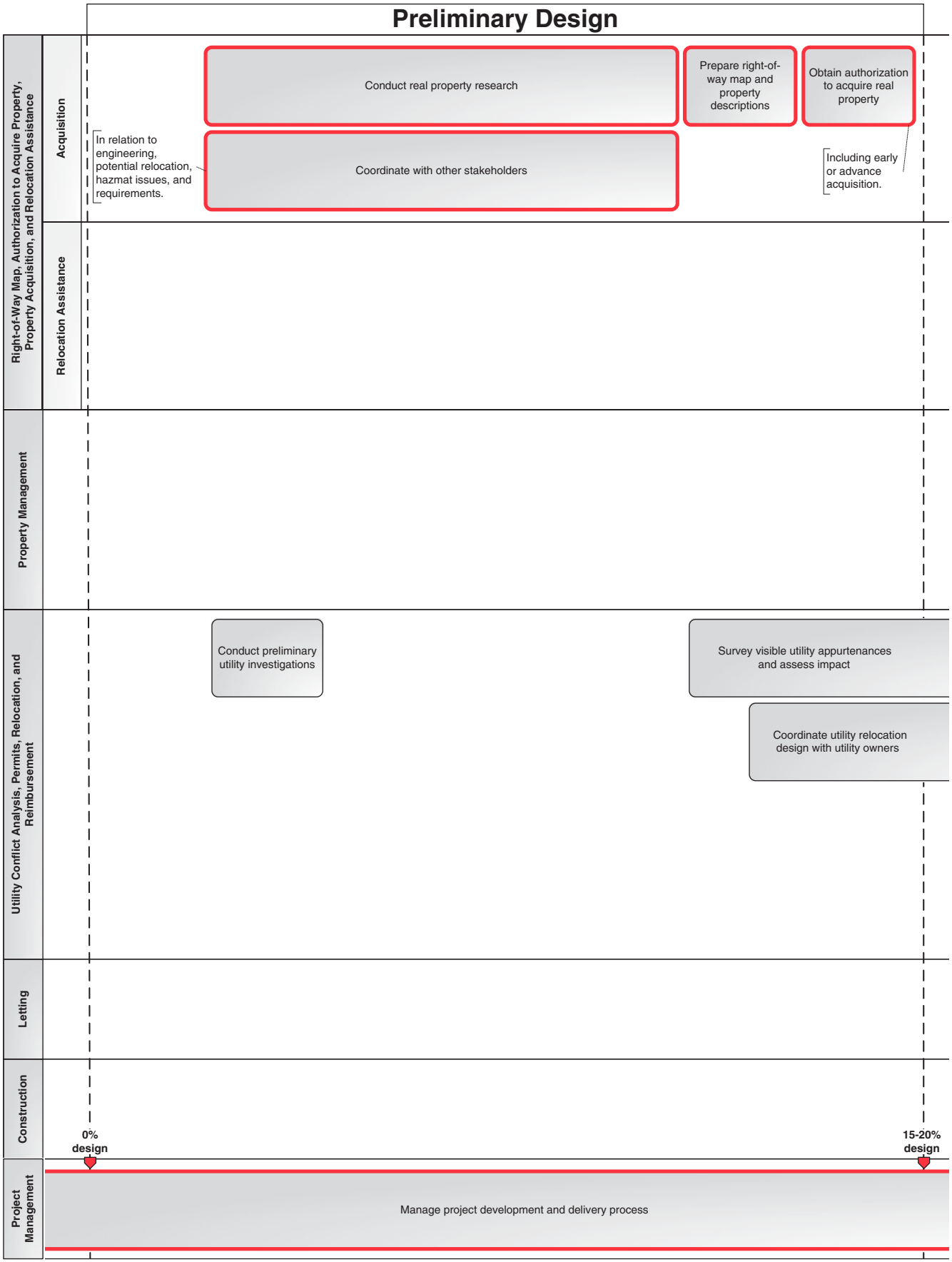


Figure 15. Typical project development and delivery process (Level 2 model)—Part D.

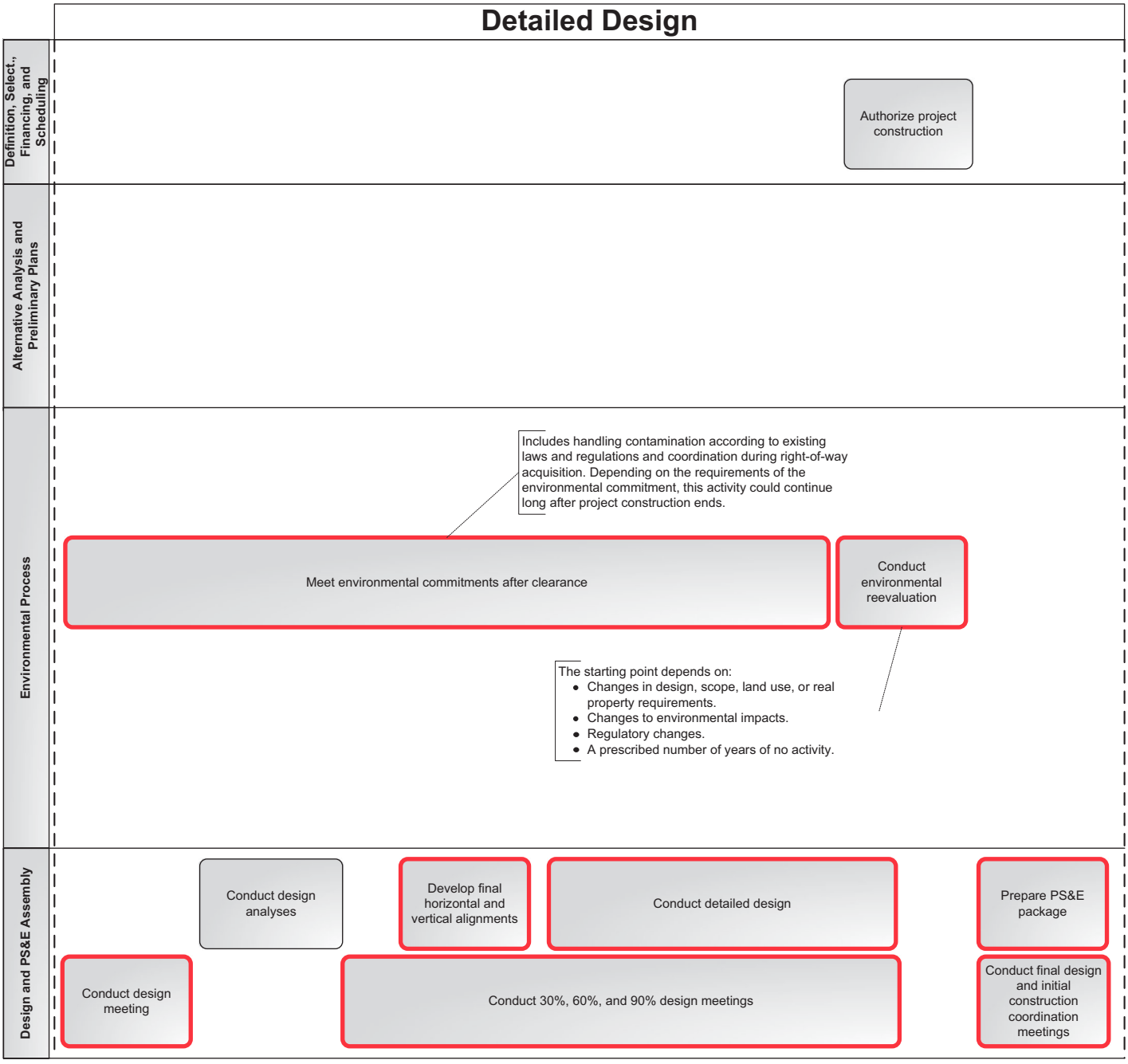


Figure 16. Typical project development and delivery process (Level 2 model)—Part E.

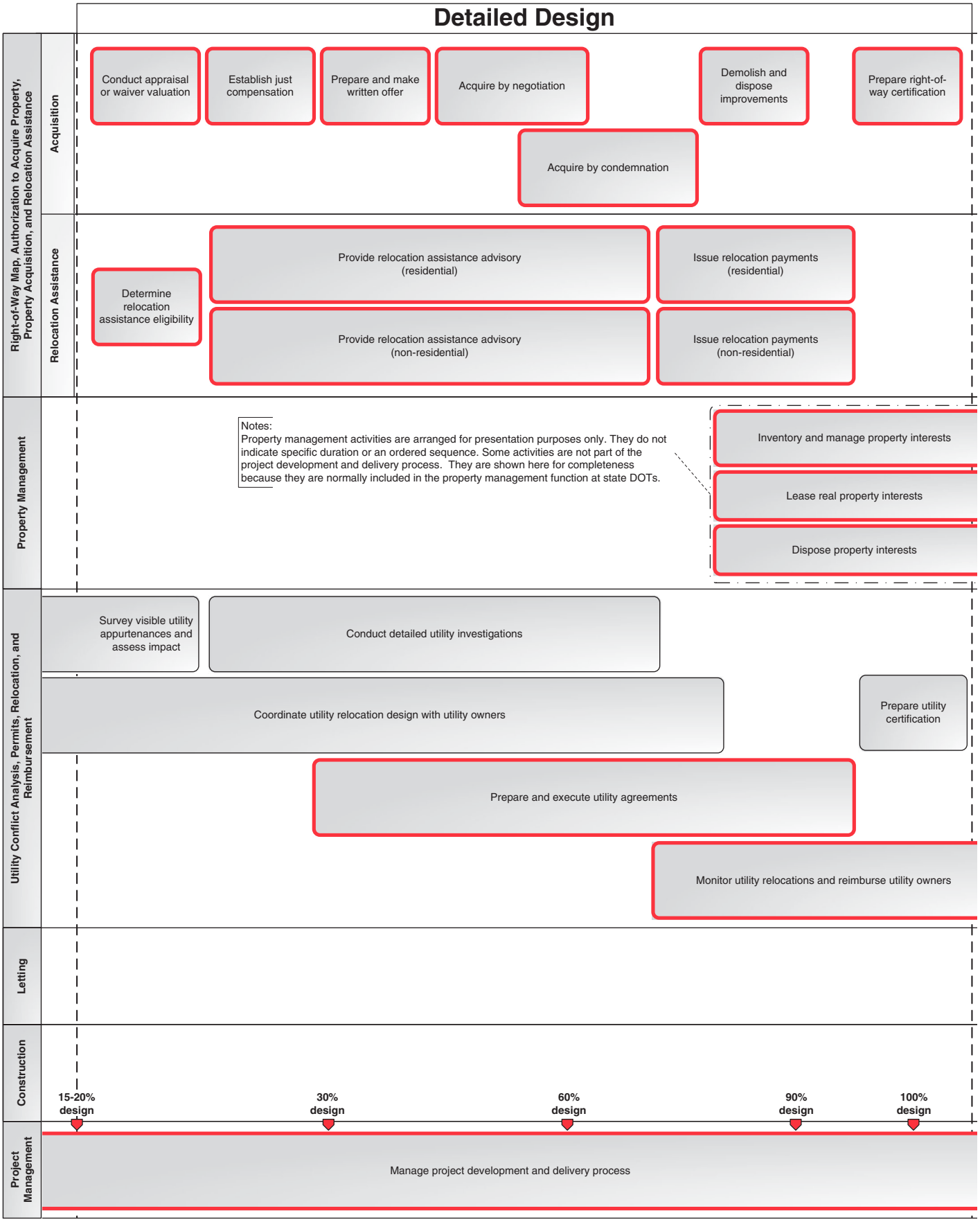


Figure 17. Typical project development and delivery process (Level 2 model)—Part F.

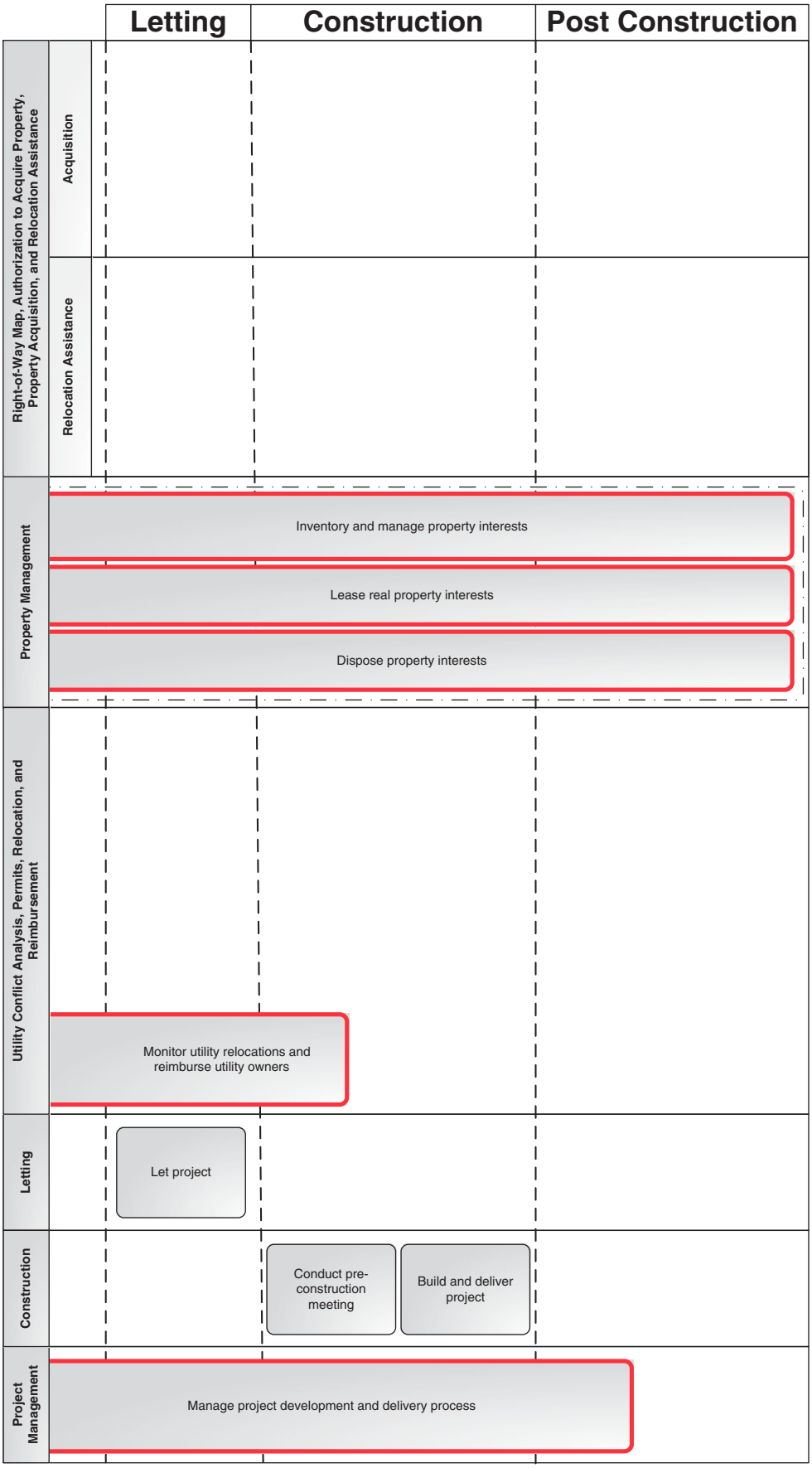
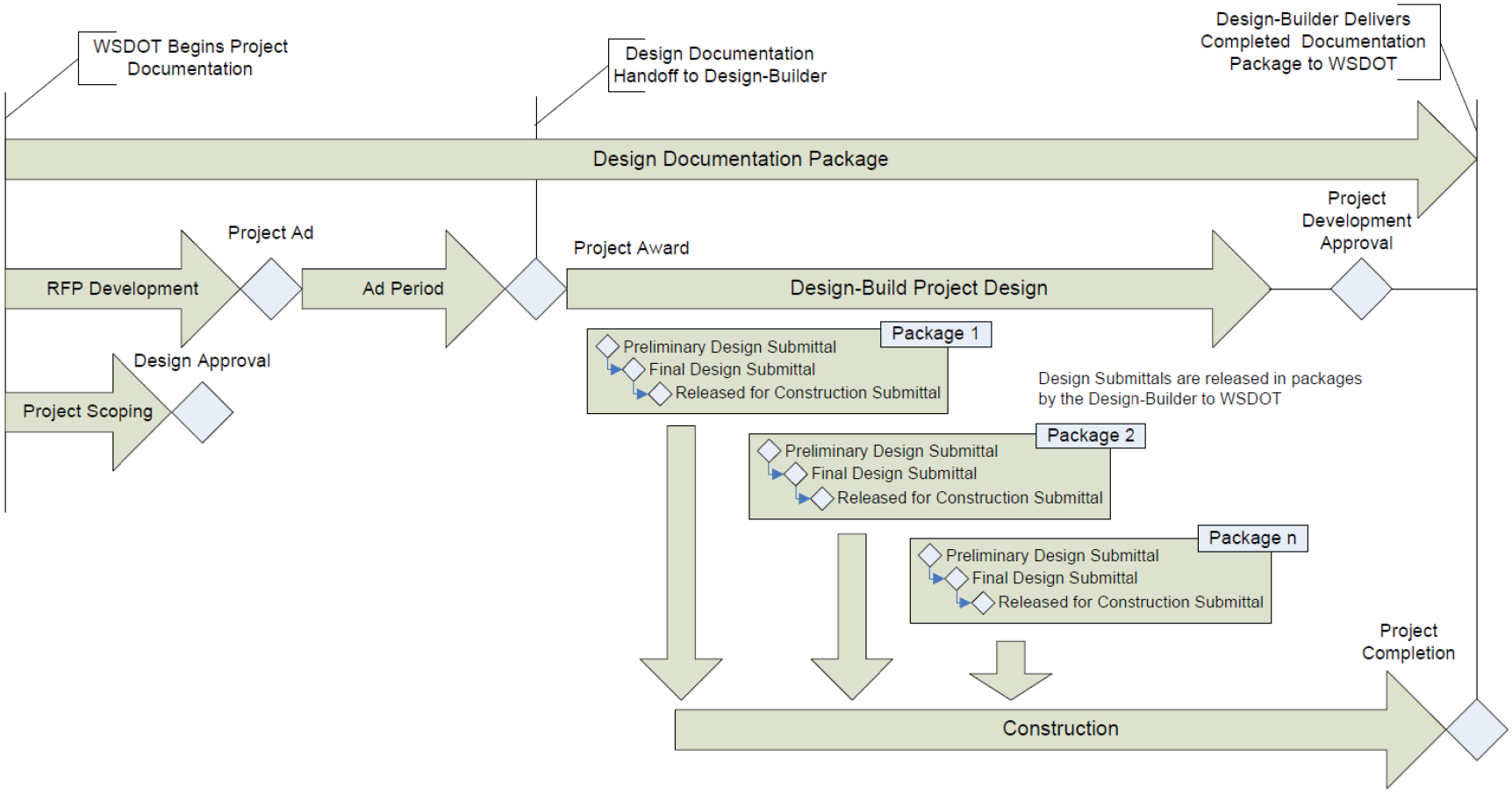


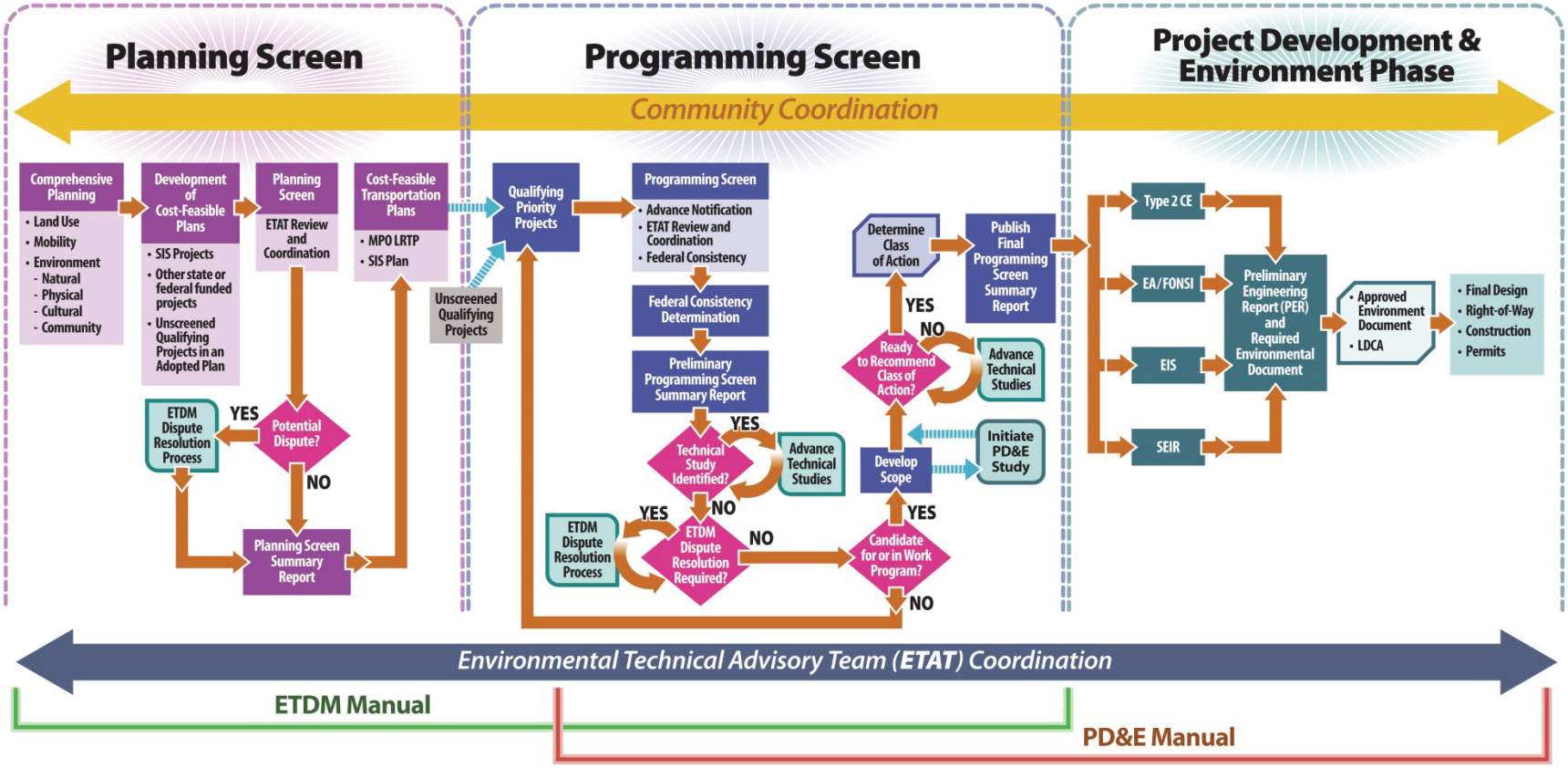
Figure 18. Typical project development and delivery process (Level 2 model)—Part G.



Notes:

- The Design Documentation Package (DDP) is started by WSDOT during scoping/pre-RFP design. The design-builder completes the DDP as the project proceeds.
- The design-builder shall refer to the RFP for specific review and approval processes. The RFP will specify procedures for design submittals, including notifications to WSDOT and the time allowed for reviews.
- WSDOT will review design submittals for conformance with requirements of the contract.

Figure 19. Design documentation sequence for a typical design-build project in Washington State (37).



Initialisms not defined previously include: EIS: environmental impact statement; FONSI: finding of no significant impact; LDCA: location and design concept acceptance; LRTP: long-range transportation plan; SEIR: state environmental impact report; and SIS: strategic intermodal system.

Figure 20. Florida DOT's efficient transportation decision-making process (38).

(*text continued from page 32*)

The Florida DOT's ETDM resulted from a consensus process that involved 24 state agencies in Florida. Participants identified three key features to improve the environmental process: early and continuous agency involvement, good data, and opportunity for feedback. The ETDM process builds in two formal opportunities for agencies to review projects before the preliminary design phase: a planning screen and a programming screen (Figure 20). The planning screen occurs around the time of preparation of long-term transportation plans to evaluate potential environmental and community effects, avoidance opportunities, mitigation requirements, and associated costs. Resource agencies review project information and communicate possible effects to project planners to help identify project configurations that minimize adverse effects. Input from those agencies may change project feasibility and cost estimates, and ultimately affect project priority.

The programming screen occurs before project selection to identify environmental issues that need to be addressed during the formal environmental review process. Resource agency input during the programming screen is more detailed than during the planning screen and includes a dispute resolution option. One of the benefits of the programming screen is that the Florida DOT does not need to prove a finding of no impact by a resource agency. For example, if no resource agency has indicated a potential biological issue during the programming screen, the DOT does not need to prove this finding by conducting a biological assessment during project development (*38*). The result is a scope of work document that focuses on known technical issues. The Florida DOT developed a guideline that explains the types of projects that require programming screens as a function of the transportation system, project funding source (federal, state, or local), and the responsible agency (*40*). Table 5 summarizes that guideline.

The Florida DOT implemented the Environmental Screening Tool (EST) to facilitate the ETDM process (*38*). EST includes four major components, as follows:

- **Data entry.** The Florida DOT and MPOs enter data into the system. In addition, resource agencies provide environmental data to the Florida Geographic Data Library (FGDL).
- **GIS analysis.** Analysts apply GIS techniques to integrate the data provided in the data entry phase.
- **Project review.** ETAT members have an opportunity to provide online comments. The public has read-only access to the information, although opportunities for commenting exist through traditional public involvement activities such as workshops and hearings.
- **Summary report.** MPO and Florida DOT ETDM coordinators prepare a report summarizing ETAT comments and, as appropriate, specific study requirements that must be addressed during project development. Each phase of the ETDM process, including the planning screen and programming screen, ends with the preparation of a summary report.

Although ETDM is a process to involve external resource agencies during the planning and programming phase, it is nonetheless relevant to this research because the concept offers a potential model for more effective, earlier participation of right-of-way officials in the project development and delivery process.

Table 5. ETDM programming screen decision matrix (adapted from [*40*]).

System	Federal Dollars		State Dollars		Local Dollars Only	
	Responsible Agency	ETDM Screening	Responsible Agency	ETDM Screening	Responsible Agency	ETDM Screening
Highways on the State Highway System (SHS) and on the Strategic Intermodal System (SIS)	Florida DOT	Yes Florida DOT Lead	Florida DOT	Yes	Florida DOT	Yes
	Local		Local and Florida DOT	Local Option	Local and Florida DOT	Local Option
Highways on the SHS but Not on the SIS	Florida DOT	Yes Florida DOT Lead	Florida DOT	Yes	Florida DOT	Yes
	Local		Local and Florida DOT	Local Option	Local and Florida DOT	Local Option
Highways Not on the SHS but on the SIS	Florida DOT	Yes Florida DOT Lead	Florida DOT	Yes	Florida DOT	Yes
	Local		Local and Florida DOT	Local Option	Local and Florida DOT	Local Option
Highways Not on the SHS and Not on the SIS	Florida DOT	Yes Florida DOT Lead	Florida DOT	Yes	Local	N/A
	Local		Local	Local Option		
Major Transit Projects (New Fixed Guideway, New Starts) or Major Freight Projects	Florida DOT	Yes	Florida DOT	Yes	Local	N/A
	Local	Local Option	Local	Local Option		

Maine

Most state DOTs depict the completion of right-of-way and utility relocation activities in their process charts and manuals at the end of design and/or letting. In some cases, the completion of those activities is shown as taking place during construction. In Maine, the Maine DOT documentation is an exception in that it explicitly shows remaining activities after the construction phase ends, primarily to address dispute resolution issues (*41*). Maine DOT documentation also includes activities for environmental coordination during letting and construction.

New Jersey

The New Jersey DOT project delivery process (Figure 21) has five phases: problem screening, concept development, preliminary engineering, final design, and construction (*42*). Concept development and preliminary engineering correspond roughly to the preliminary design phase shown in Figure 10. The New Jersey DOT has established guidelines that provide information on how to adjust the project delivery process based on project-specific needs. The New Jersey DOT delivery process, depicted in Figure 21, is also unique in that it explicitly identifies critical drivers and output products associated with each phase, including funding sources, key tasks, public involvement requirements, key products, and responsible divisions.

Ohio

The Ohio DOT has a project development and delivery process that consists of five general phases after long-term planning: planning, preliminary engineering, environmental engineering, final engineering, and construction (*43*). Within each phase, specific activities depend on the specific path a project follows. As Table 6 shows, the Ohio DOT has identified five different project paths, depending on project size, complexity, and/or potential environmental impacts. The project path indicates the level of analysis required, the amount of stakeholder participation, and the activities conducted during each phase. This classification provides project managers with flexibility to adjust scope activities within each phase to facilitate decision making. The Ohio DOT also has established typical project milestones for each of the five paths (Table 7). The milestones must be evaluated and selected based on the project's critical path during the scoping process.

Vermont

The Vermont Agency of Transportation project development and delivery process uses a different definition for what is included in the design phase (*44*). In the Vermont process, the preliminary engineering phase is called project definition or conceptual design. This phase ends with the approval of the environmental document. The design phase, which is called project design and includes letting, includes three levels of plan development (Figure 22):

- **Preliminary plan development.** This level follows the approval of the environmental document and results in the development of preliminary plans. These plans include elements such as width and depth transitions, roadside barriers, cut-fill transitions, drainage and erosion control, and intersecting highway approaches. As part of this level, the Vermont Agency of Transportation sends a copy of the preliminary plans to utility owners, with a request to prepare relocation plans within 2 months of receiving the preliminary plans. The agency also schedules visits to affected property owners.
- **Semifinal plan development.** This level involves including any changes in design details resulting from the meeting with property owners or in response to feedback from permitting agencies. After completing this level, officials develop right-of-way maps and request authorization to acquire right-of-way.
- **Final plan development.** This level involves finalizing the design, including the development of most of the structural design, traffic signal, and landscaping details. This phase also includes the acquisition of any necessary property rights and execution of any necessary utility and railroad agreements. This level ends with the completion of the contract plans, specifications, and the estimate, along with the advertisement of the project for bids.

Washington State

The Washington State DOT follows a project development and delivery process that assigns a percentage of design completion to all phases of development after planning and programming (*45*). Each phase has a number of milestones associated with it, both at the project overview level and by functional area. As an illustration, Table 8 lists typical milestones at the project overview level as well as milestones associated with critical real property acquisition and utility process activities.

At the individual project level, the Washington State DOT uses scheduling software that ties the list of deliverables at each step of the process with the activities that need to take place to complete the project. Developing the schedule for a project involves the following high-level activities:

- Identify the project route type and the corresponding design matrix. Using this matrix, identify the design level, design elements, and project type for the project.
- Identify project milestones.

(*text continues on page 50*)

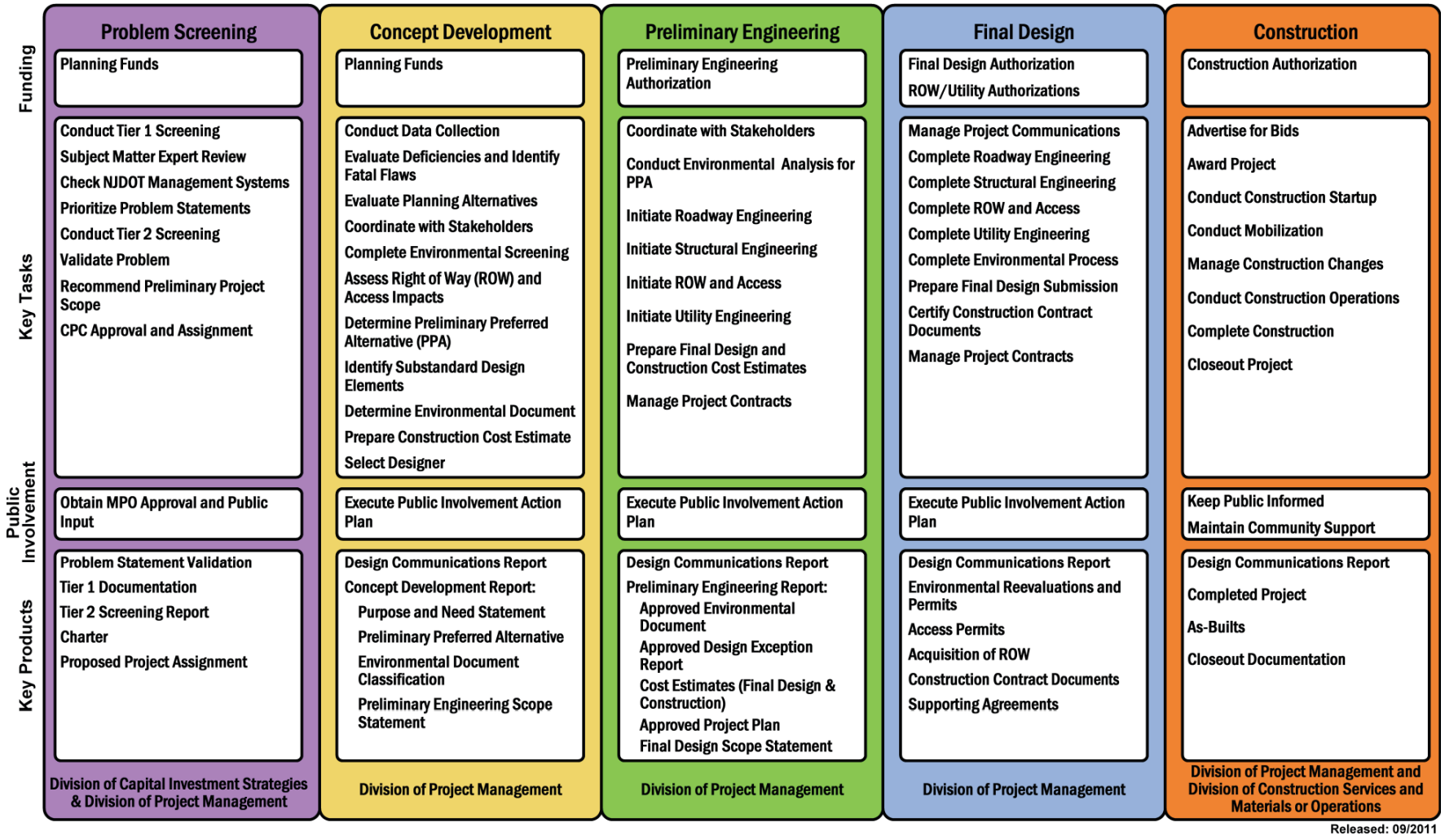


Figure 21. The New Jersey DOT's project development and delivery process (42).

Table 6. The Ohio DOT's project paths (adapted from [*43*]).

Path	Type of Project
1	Path 1 projects are simple transportation improvements generated by traditional maintenance and preventive maintenance needs. They involve minor structure and roadway maintenance work with no real property or utility impacts. These projects are typically NEPA excluded or require CE Level 1 documents.
2	Path 2 projects are simple projects that might include minor structure and roadway work. Examples include culvert and bridge replacement or reconstruction, resurfacing, and addition of turn lanes and shoulders. These projects can involve non-complex real property acquisitions (e.g., strip takes, temporary easements and channel easements). These projects typically require CE Level 1 documents.
3	Path 3 projects involve a higher level of complexity than projects in Path 1 and Path 2. They include moderate roadway and structure work such as intersection and minor interchange upgrades, minor realignments, reconstruction, and median widening. They can involve real property acquisition and utility relocations. These projects typically require CE Level 2, CE Level 3, or CE Level 4 documents.
4	Path 4 projects involve complex roadway and structure work that may add capacity. Path 4 projects typically have multiple alternatives. Projects may include highway widening, new alignments in suburban or rural settings, reconstruction, access management, complex bridge replacement, and multiple intersection and interchange alternatives. They typically have substantial real property and utility impacts. These projects typically require CE Level 3, CE Level 4, EA, or EIS documents.
5	Path 5 projects have the highest complexity and typically add capacity. Examples include new capacity in complex urban centers, major highway widening, and reconstructing or adding interchanges. These projects normally have substantial, complex real property and utility issues, involve multiple alternatives, and have access management issues. These projects typically require CE Level 4, EA, or EIS documents.

Table 7. The Ohio DOT's project development process milestones (adapted from [*43*]).

Phase	Path 1 Milestones	Path 2 Milestones	Path 3 Milestones	Path 4/5 Milestones
Planning (project specific, after long-term planning)	Project Initiation Package Concept, Scope, and Budget/Estimates	Project Initiation Package Purpose and Need Concept, Scope, and Budget/Estimates	Project Start-Up Meeting Project Initiation Package Purpose and Need Concept, Scope, and Budget/Estimates	Project Start-Up Meeting Project Initiation Package Purpose and Need Concept, Scope, and Budget/Estimates
Preliminary Engineering	NEPA Study	Feasibility Study NEPA Study Updated Cost Estimates Establish Preferred Alternative	Feasibility Study NEPA Study Establish Preferred Alternative Updated Cost Estimates	Feasibility Study NEPA Study Updated Cost Estimates Alternative Evaluation Report Establish Preferred Alternative Stage 1 Design
Environmental Engineering	NEPA and Permit Approval	Stage 2 Design and Approval Preliminary Right-of-Way Plans NEPA and Permit Approval Final Right-of-Way Plans Updated Cost Estimates	Establish Construction Limits Stage 2 Design and Approval Preliminary Right-of-Way Plans NEPA and Permit Approval Final Right-of-Way Plans Updated Cost Estimates Mitigation Plans	Stage 1 Approval Preliminary Right-of-Way Plans Stage 2 Design and Approval NEPA and Permit Approval Final Right-of-Way Plans Updated Cost Estimates Mitigation Plans
Final Engineering and Right-of-Way	Stage 3 Design and Approval Updated Cost Estimates Final Plan Package	Real Property Acquisition Stage 3 Design and Approval Updated Cost Estimates Final Plan Package	Real Property Acquisition Stage 3 Design and Approval Updated Cost Estimates Final Plan Package	Real Property Acquisition Stage 3 Design and Approval Updated Cost Estimates Final Plan Package
Construction	Advertise Award Contract Monitor Contract	Advertise Award Contract Monitor Contract	Advertise Award Contract Monitor Contract	Advertise Award Contract Monitor Contract

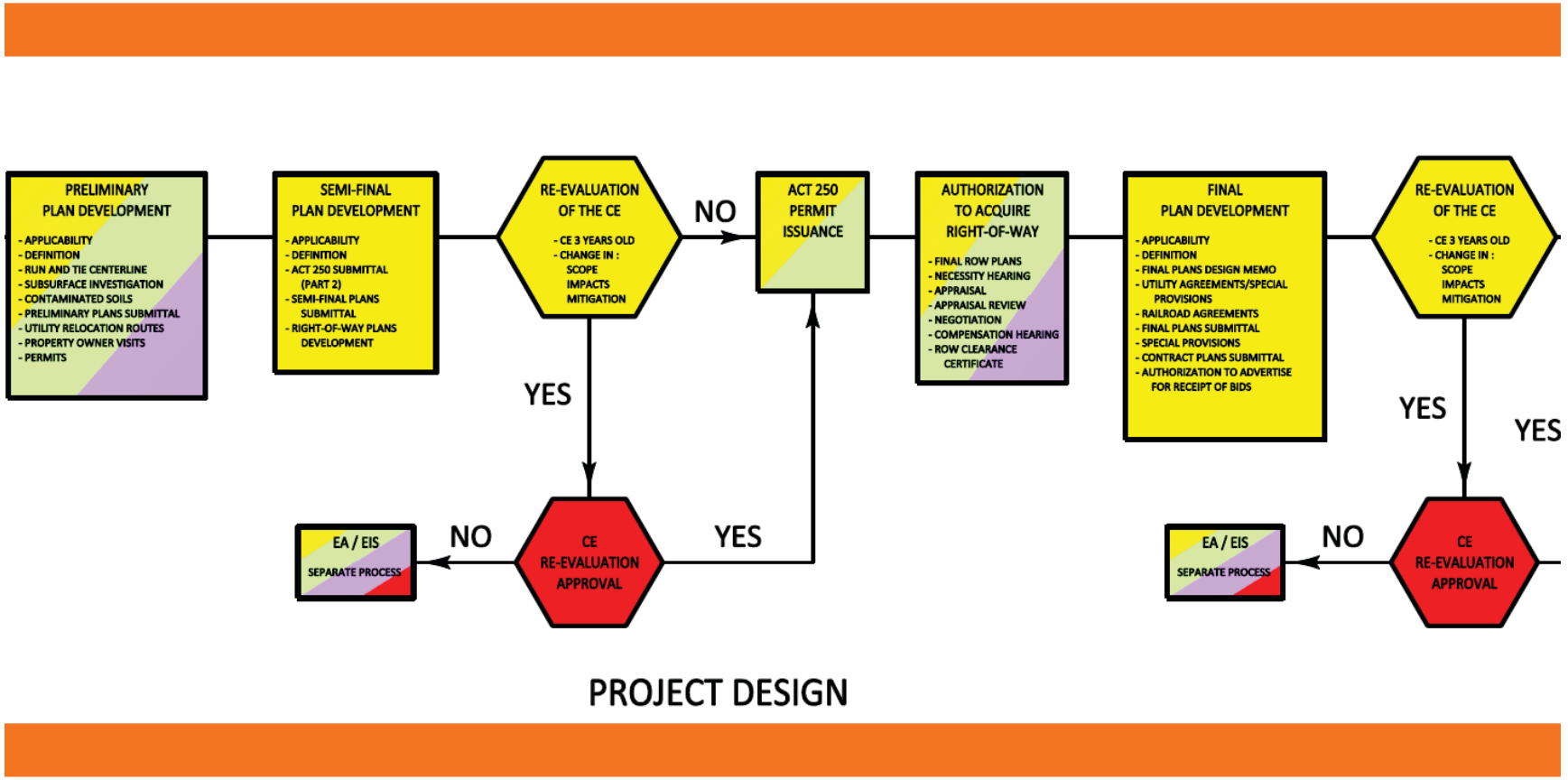


Figure 22. The Vermont Agency of Transportation's project design phase (adapted from [44]).

Table 8. Washington State DOT deliverable expectation matrix—project overview, right-of-way, and utilities (adapted from [*45*]).

Phase	Project Overview Milestones	Real Property Acquisition Milestones	Utility Process Milestones
Project Definition		Requirements for real property documented	Utilities within the project limits notified Washington Utilities Transportation Commission (WUTC) permit application for railroad crossings submitted
Project Initiation and Alignment	Expected level of effort Authorized budget Deliverable list	Preliminary real property needs identified	Potential utility relocations identified Responsibility for costs established
Project Planning and Scoping (10%)	Milestone dates set Study framework set Study criteria set Assumptions defined Design criteria set	Title reports ordered	Utility as-builts requested Railroad issues identified Relocation cost responsibility defined Franchise and permit documentation collected Utility relocation strategy for project established
Geometric Review (30%)	Design concept fixed Design features defined NEPA/State Environmental Policy Act (SEPA) approval obtained Type size and location of all structures fixed Footprint set Approval to begin real property acquisition process Approval of geometric design Design concurrence/approval	Right-of-way plan completed and approved Real property appraisals completed Relocation plan completed Real property project funding estimate prepared Right-of-entry for project investigations obtained	Utility plan with as-built information completed and transmitted to utility owners Preliminary utility conflicts identified Utility object relocation record (UORR) sent to utility owners Project Overview Meeting held with utility owners Quality level C (QLC) and quality level D (QLD) completed Determination of need for quality level B (QLB) and quality level A (QLA) Relocation plans and schedule requested from utility owners Franchise and permit process initiated Cost recovery accounts initiated Utility property rights verified Railroad standard construction maintenance agreement (CMA) obtained
General Plans Review (60%)	All key project elements and features that drive the project outcome and costs defined Type, size, and location of key elements and features fixed Geometric review comments resolved and documented	Real property appraisal reviews completed and offers made Real property acquisition and relocation initiated	Utility conflicts confirmed and relocation letters sent to utility owners Utility relocation meeting held Utility relocation plans and schedules obtained and approved Utility and railroad agreements completed Utility permits and franchises obtained Utility agreements finalized (cost responsibility estimate completed)
Preliminary Contract Review (90%)	Deliverables substantially complete Review and acceptance of design detail of key elements and features Permits obtained; all environmental permits approved, verified, and accepted for inclusion into the plans General plan review comments resolved and documented	Real property negotiations completed	Utility relocation plan information and specifications incorporated in PS&E Letters of Understanding issued to utility owners requiring relocation Utility, service, and railroad agreements completed Utility relocation and schedule monitored and coordination completed CMA completed
Final Contract Review (100%)	Deliverables complete All review comments adjudicated Plans and specifications stamped and sealed at end Right-of-way certification Final project approval	Real property relocations completed	
Contract Advertisement and Award	Design accepted Approval to advertise Right-of-way is clear	Right-of-way certified	Utility relocation work completed
Project Close Out and Archiving	PS&E documents boxed with original plans and sent to archive Electronic files and supporting project documentation transmitted to Washington State DOT project manager		

(*continued from page 45*)

- Create the work breakdown structure (WBS) for the project using the master deliverable list (MDL) and the deliverable expectation matrix.
  - Start at Level 1 and delete what is not needed.
  - Repeat for each MDL level.
  - Add subtasks to each project deliverable.
- Identify tasks and deliverables in the task planning worksheet using the WBS.
- For each task:
  - Select the method to determine percentage completed (e.g., units produced, milestones, 0–100 convention).
  - Estimate task duration.
- Determine task constraints (i.e., dependencies) and resources for the project.
- Create the network (precedence) diagram and the Gantt chart for the project.

Real Property Acquisition and Relocation Assistance According to the Uniform Act

The Uniform Act, as amended by Congress, is codified as 42 U.S.C. 4601 et seq. in the U.S. Code. Table 9 provides a correlation between the various provisions in 42 U.S.C. 4601

Table 9. Comparison between 42 U.S.C. 4601 et seq. and the Uniform Act (as amended).

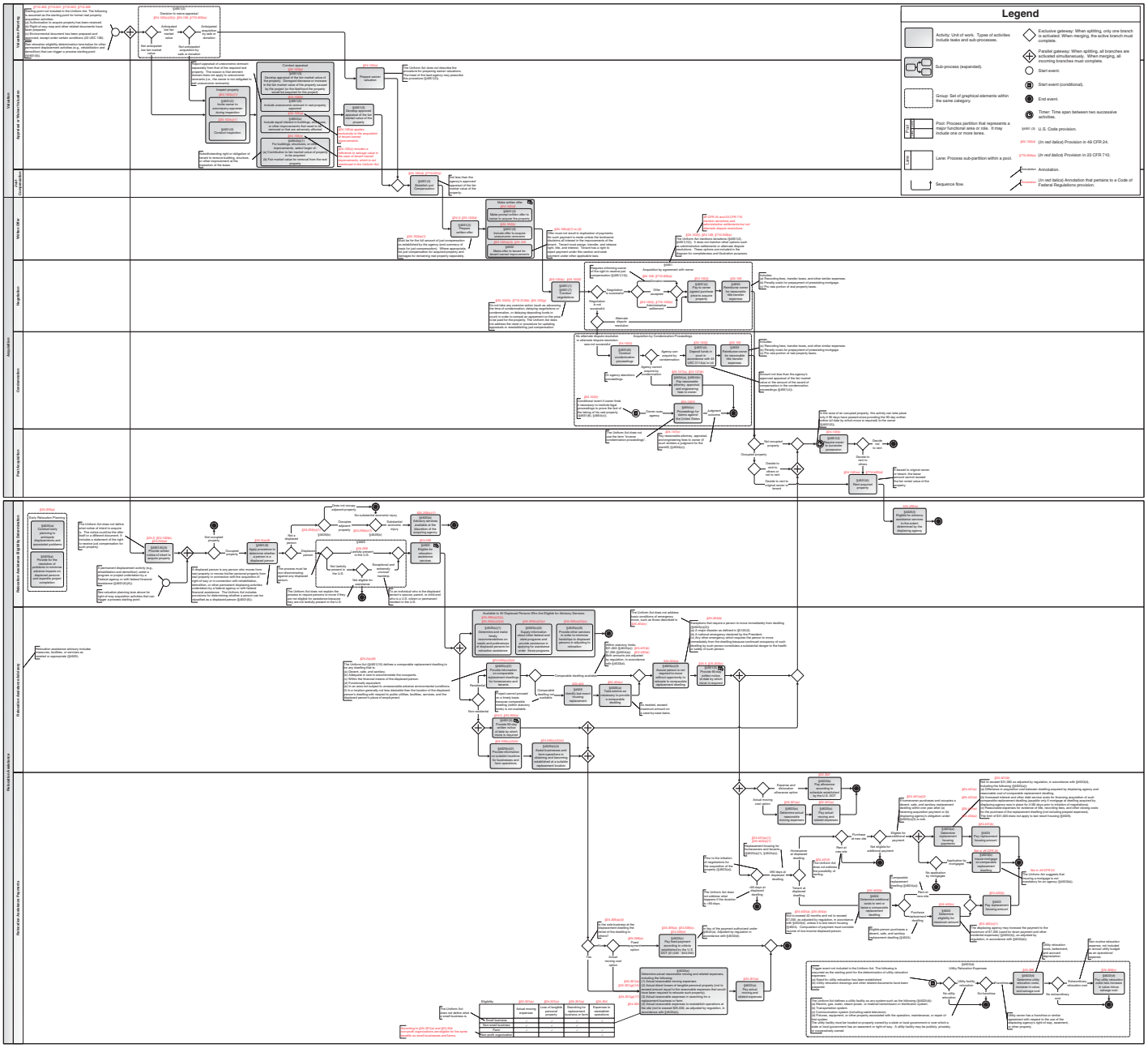
42 U.S.C. 4601 et seq.	Uniform Act (as Amended)	Comment
Most current version	Public Law 91-646 (01/1971) Public Law 100-17 (04/1987) Public Law 102-240 (12/1991) Public Law 105-117 (11/1997) Public Law 112-141 (07/2012)	
Subchapter I—General Provisions	Title I—General Provisions	
§4601	§101	
§4602	§102	
§4603		Added by Public Law 93-477 in 1974
§4604	§103	
§4605	§104	
Subchapter II—Uniform Relocation Assistance	Title II—Uniform Relocation Assistance	
§4621	§201	
§4622	§202	
§4623	§203	
§4624	§204	
§4625	§205	
§4626	§206	
§4627	§207	
§4628	§208	
§4629	§209	
§4630	§210	
§4631	§211	
§4632	§212	
§4633	§213	
§4634	§214	Repealed by Public Law 100-17 in 1987 Added by Public Law 112-141 in 2012 42 U.S.C. 4634 likely to be added for the next U.S. Code update
§4635	§215	
§4636	§216	
§4637		Repealed by Public Law 100-17 in 1987
§4638	§218	
Subchapter III—Uniform Real Property Acquisition Policy	Title III—Uniform Real Property Acquisition Policy	
§4651	§301	
§4652	§302	
§4653	§303	
§4654	§304	
§4655	§305	

et seq. and the corresponding provisions in the original Uniform Act and subsequent laws that have amended or supplemented the Uniform Act.

The research team developed a graphical depiction of the property acquisition and relocation assistance model according to 42 U.S.C. 4601 et seq., without encumbrances from current regulations (i.e., the Level 3 model). Figure 23 shows this model. Figure 24 shows the relationship between this model and the Level 1 and Level 2 models. The next 15 figures (Figure 25 through Figure 39) provide detailed views of the Level 3 model. For clarity, the partial views of the Level 3 model in these figures use throw and catch link intermediate events instead of the sequence flows shown in Figure 23.

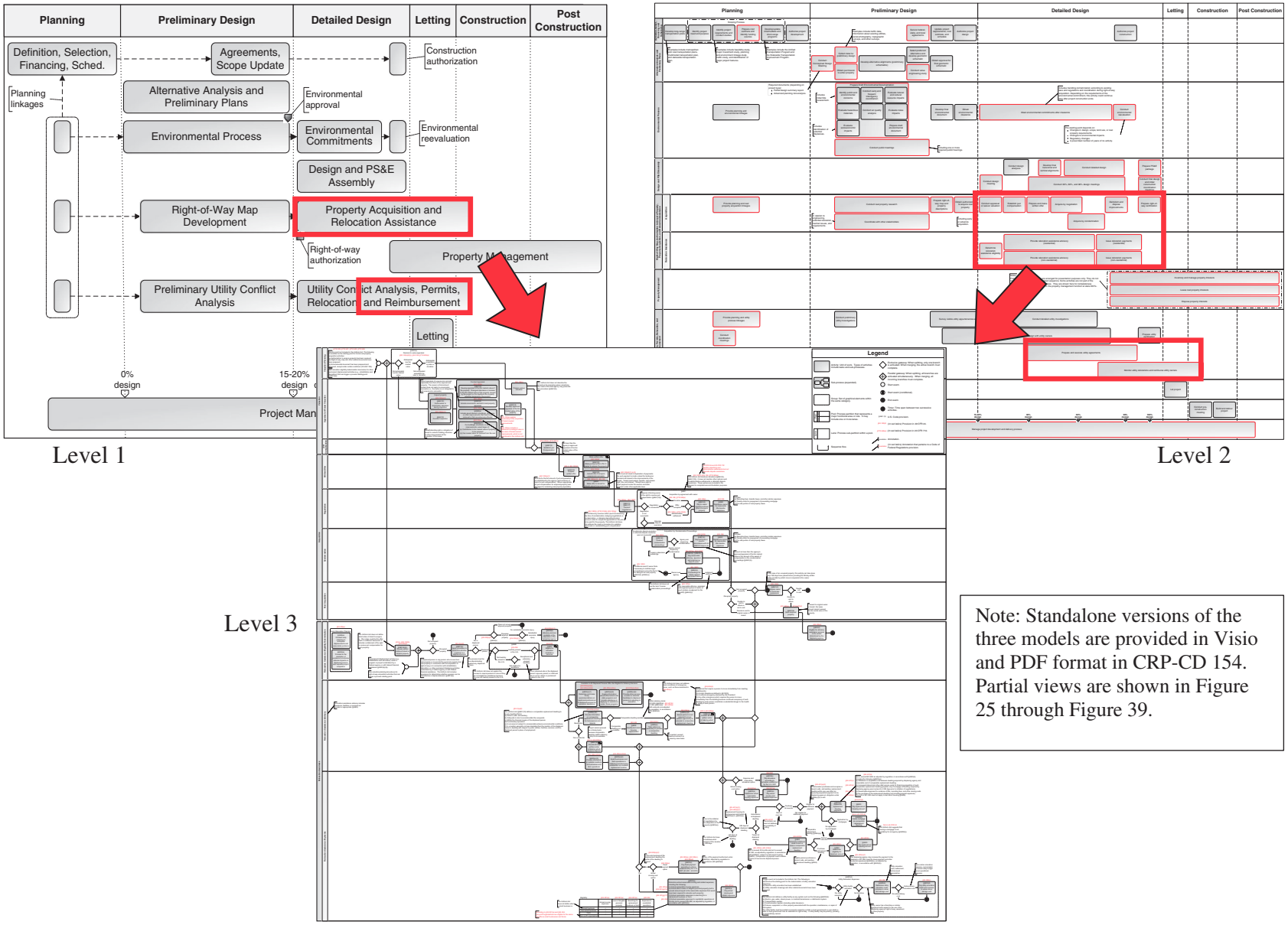
The Uniform Act includes several provisions that cannot be mapped easily to individual activities in the project development and delivery process (e.g., provisions that pertain to

(*text continues on page 59*)



Note: Standalone versions of this diagram in Visio format and PDF are also provided in CRP-CD 154.

Figure 23. Real property acquisition according to the Uniform Act (Level 3 model).



Note: Standalone versions of the three models are provided in Visio and PDF format in CRP-CD 154. Partial views are shown in Figure 25 through Figure 39.

Figure 24. Relationships between the Level 1, Level 2, and Level 3 models.

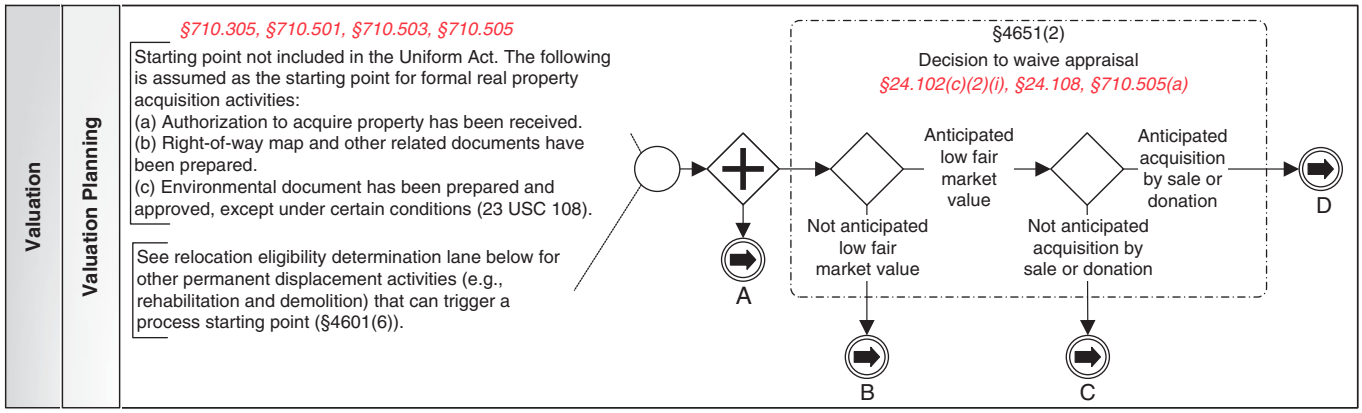


Figure 25. Real property acquisition according to the Uniform Act—valuation (valuation planning).

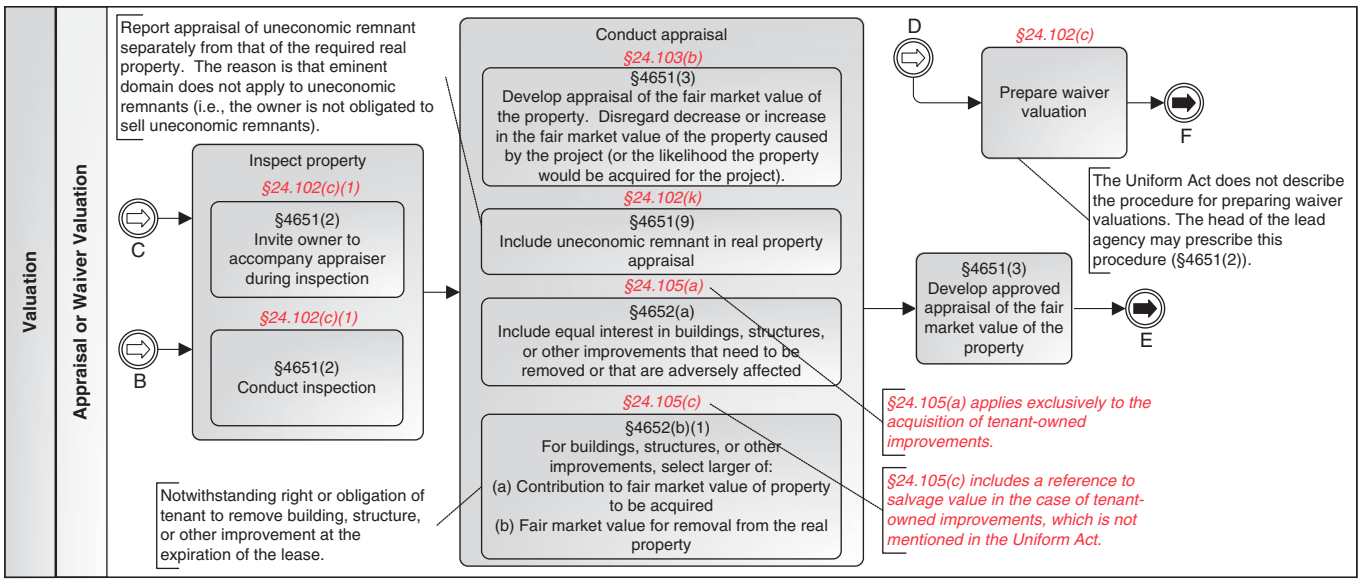


Figure 26. Real property acquisition according to the Uniform Act—valuation (appraisal or waiver valuation).

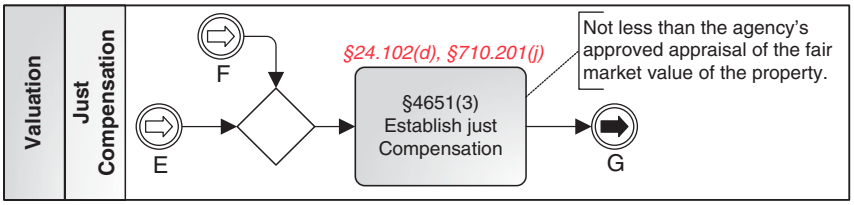


Figure 27. Real property acquisition according to the Uniform Act—valuation (just compensation).

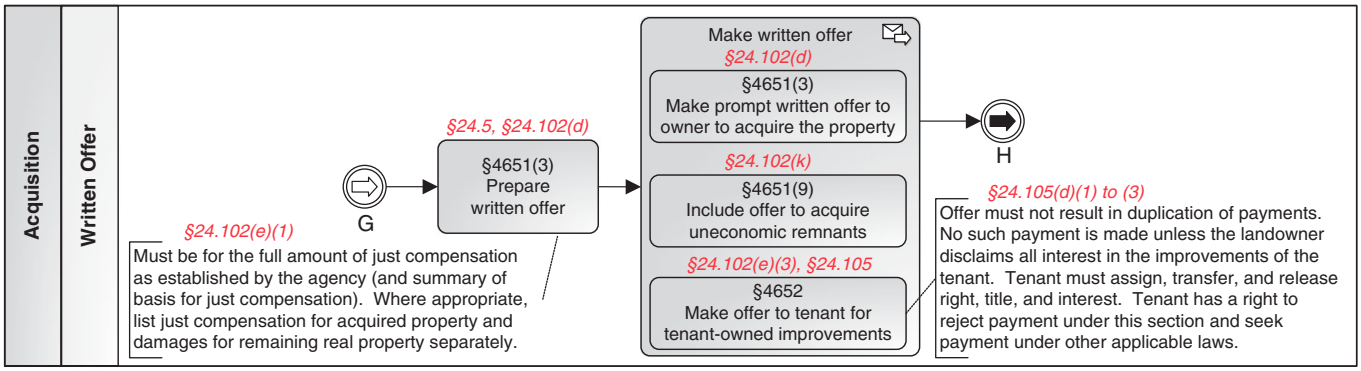


Figure 28. Real property acquisition according to the Uniform Act—acquisition (written offer).

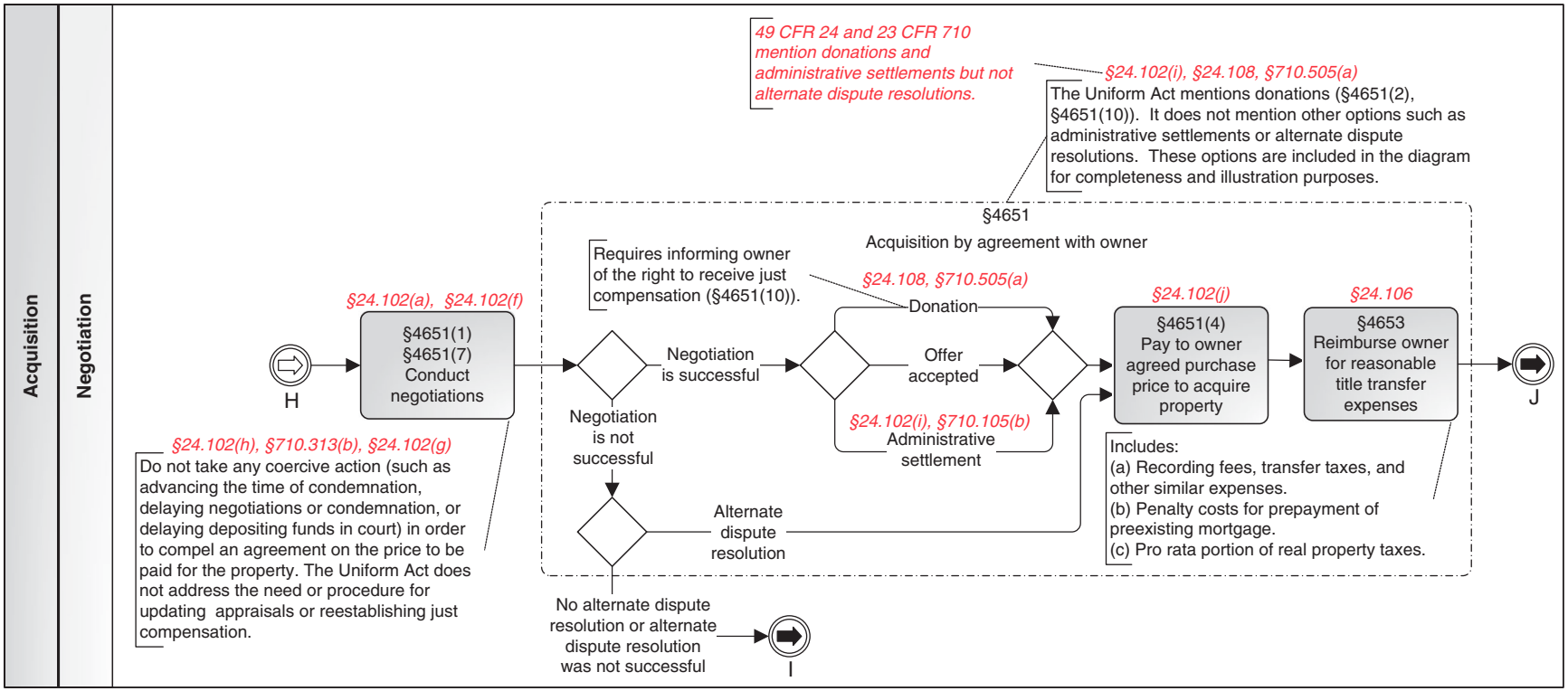


Figure 29. Real property acquisition according to the Uniform Act—acquisition (negotiation).

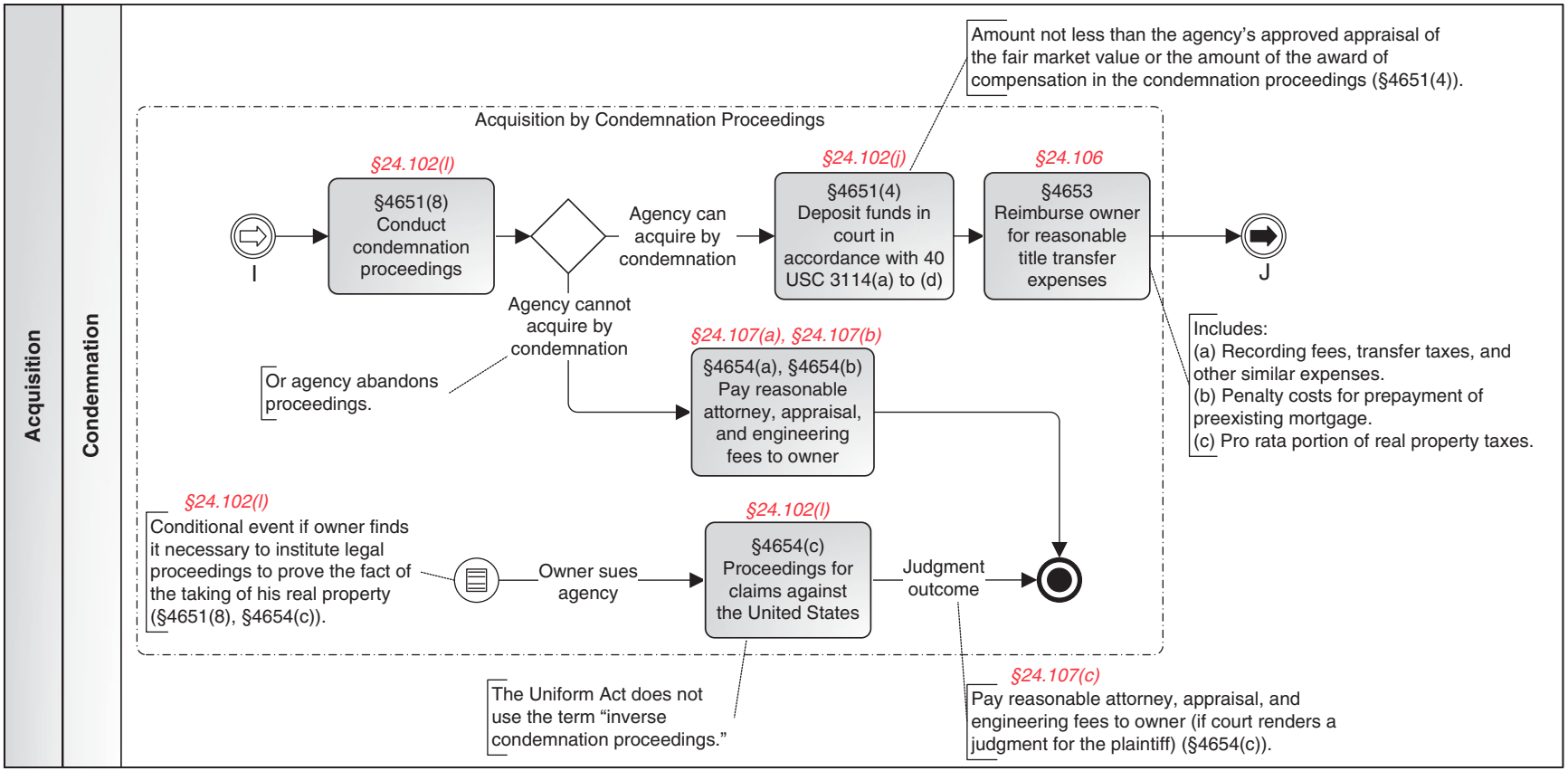


Figure 30. Real property acquisition according to the Uniform Act—acquisition (condemnation proceedings).

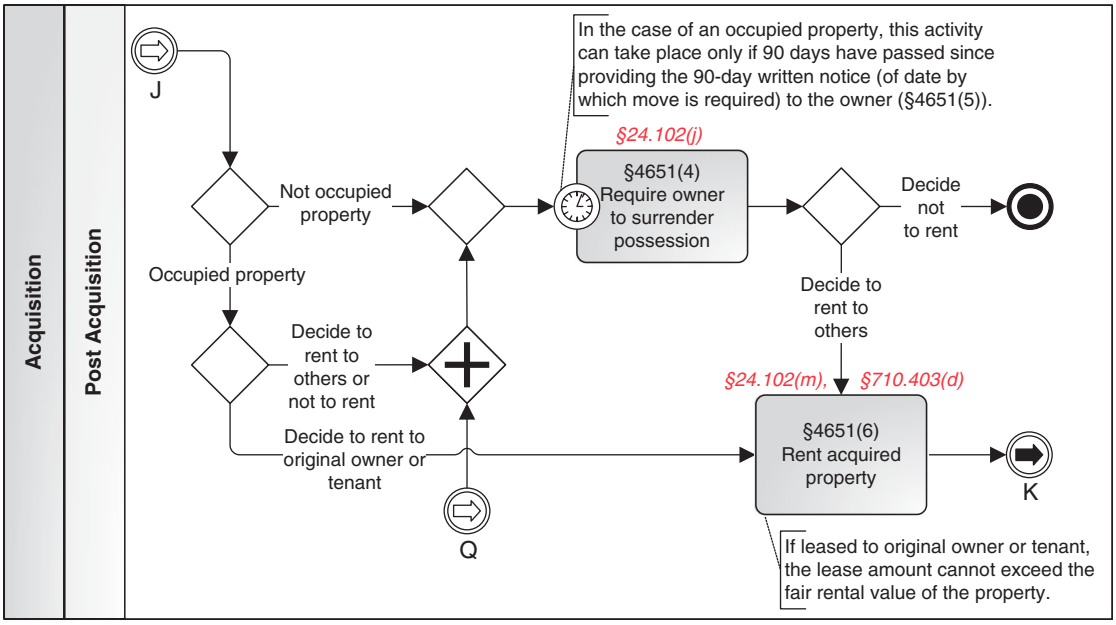


Figure 31. Real property acquisition according to the Uniform Act—acquisition (post acquisition).

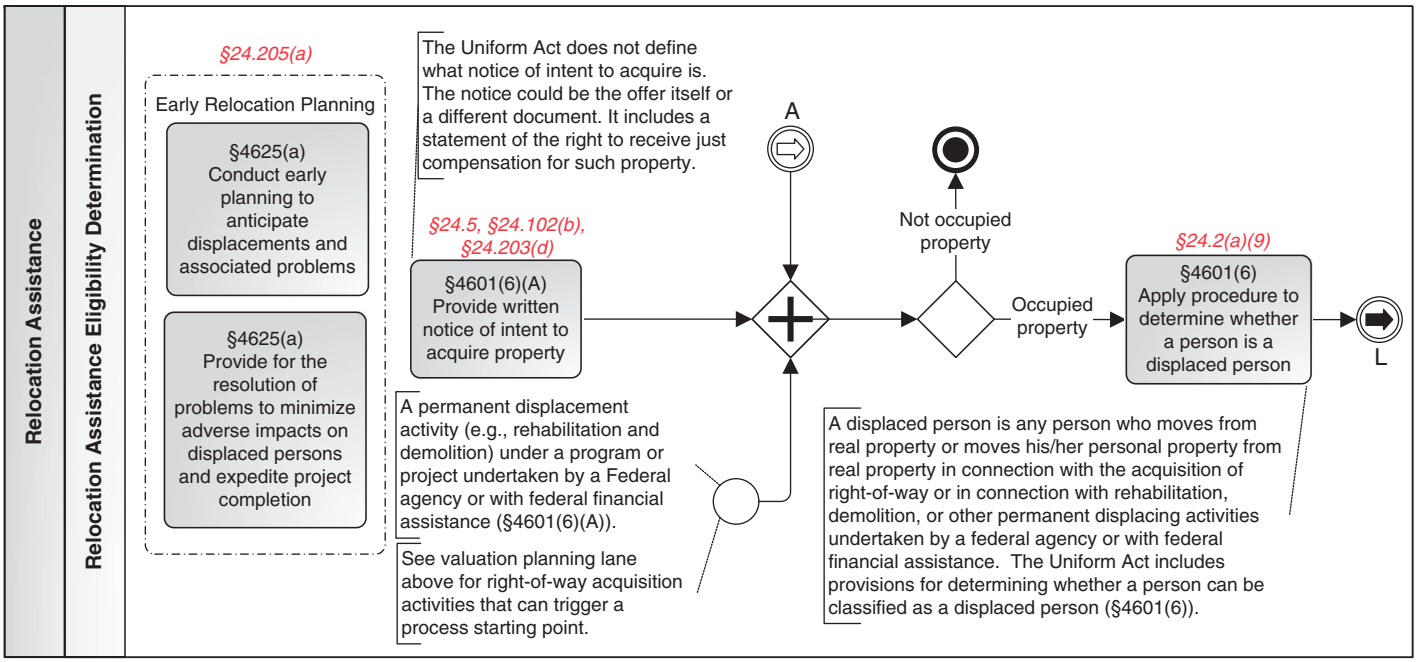


Figure 32. Real property acquisition according to the Uniform Act—relocation assistance (relocation assistance eligibility determination—Part 1).

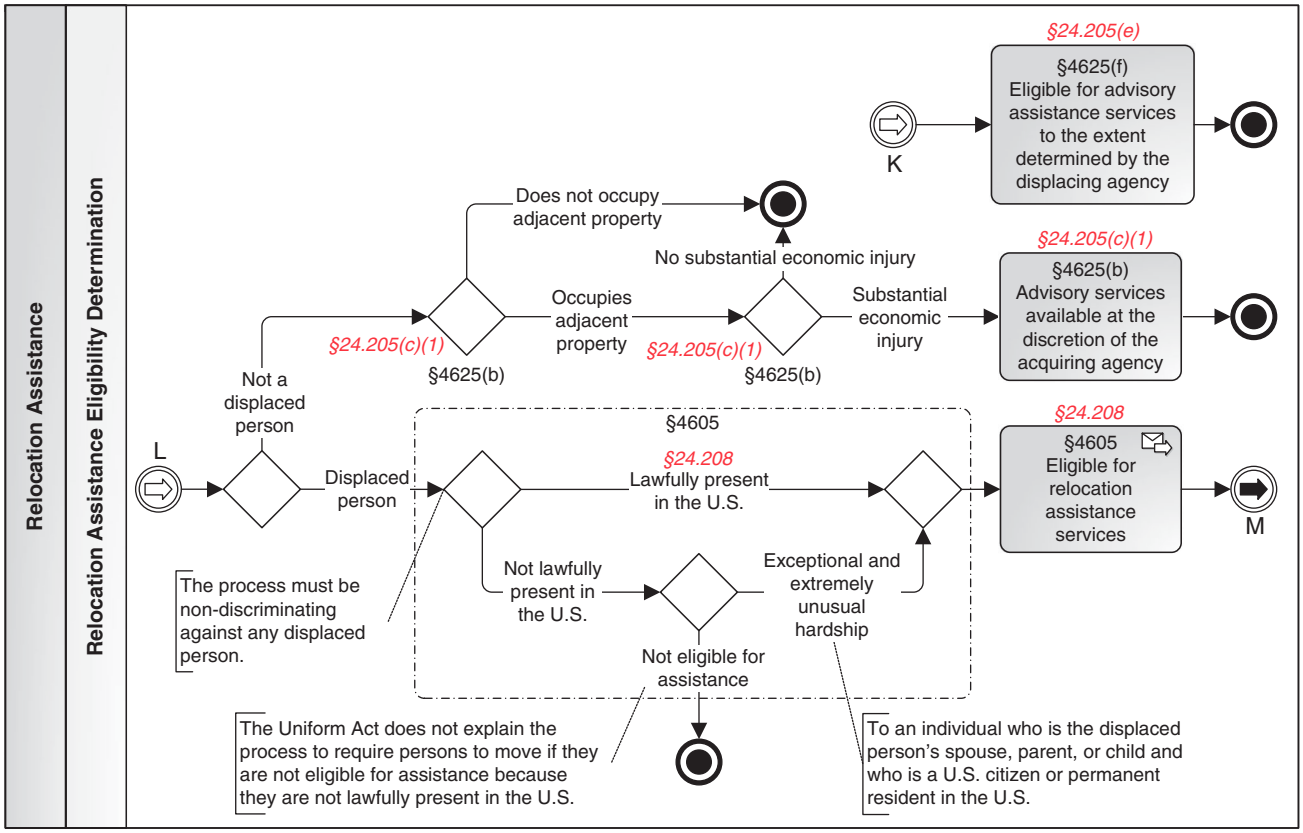


Figure 33. Real property acquisition according to the Uniform Act—relocation assistance (relocation assistance eligibility determination—Part 2).

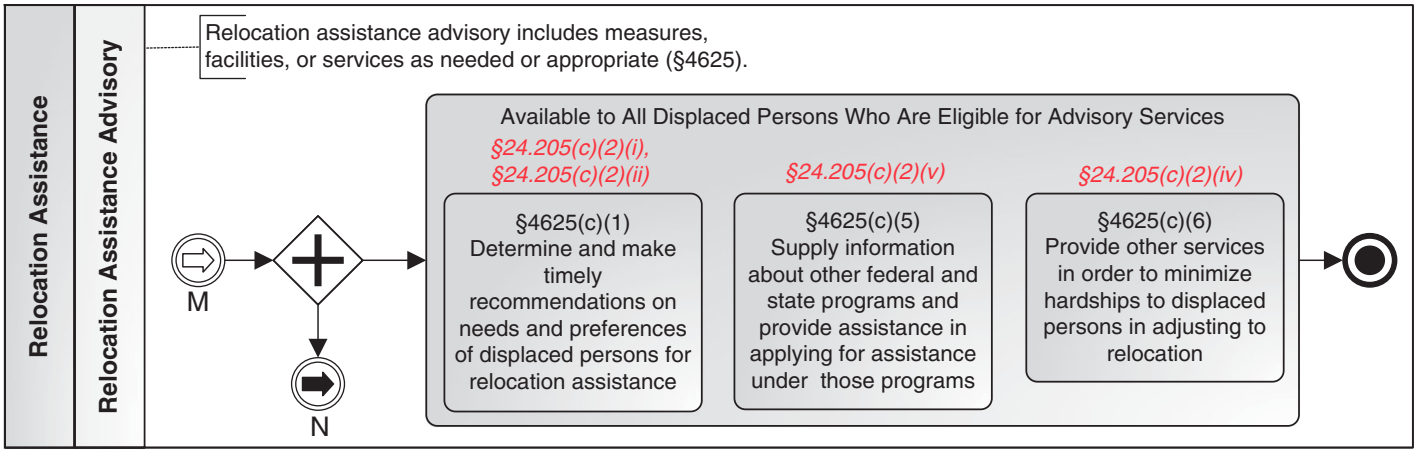


Figure 34. Real property acquisition according to the Uniform Act—relocation assistance (relocation assistance advisory—Part 1).

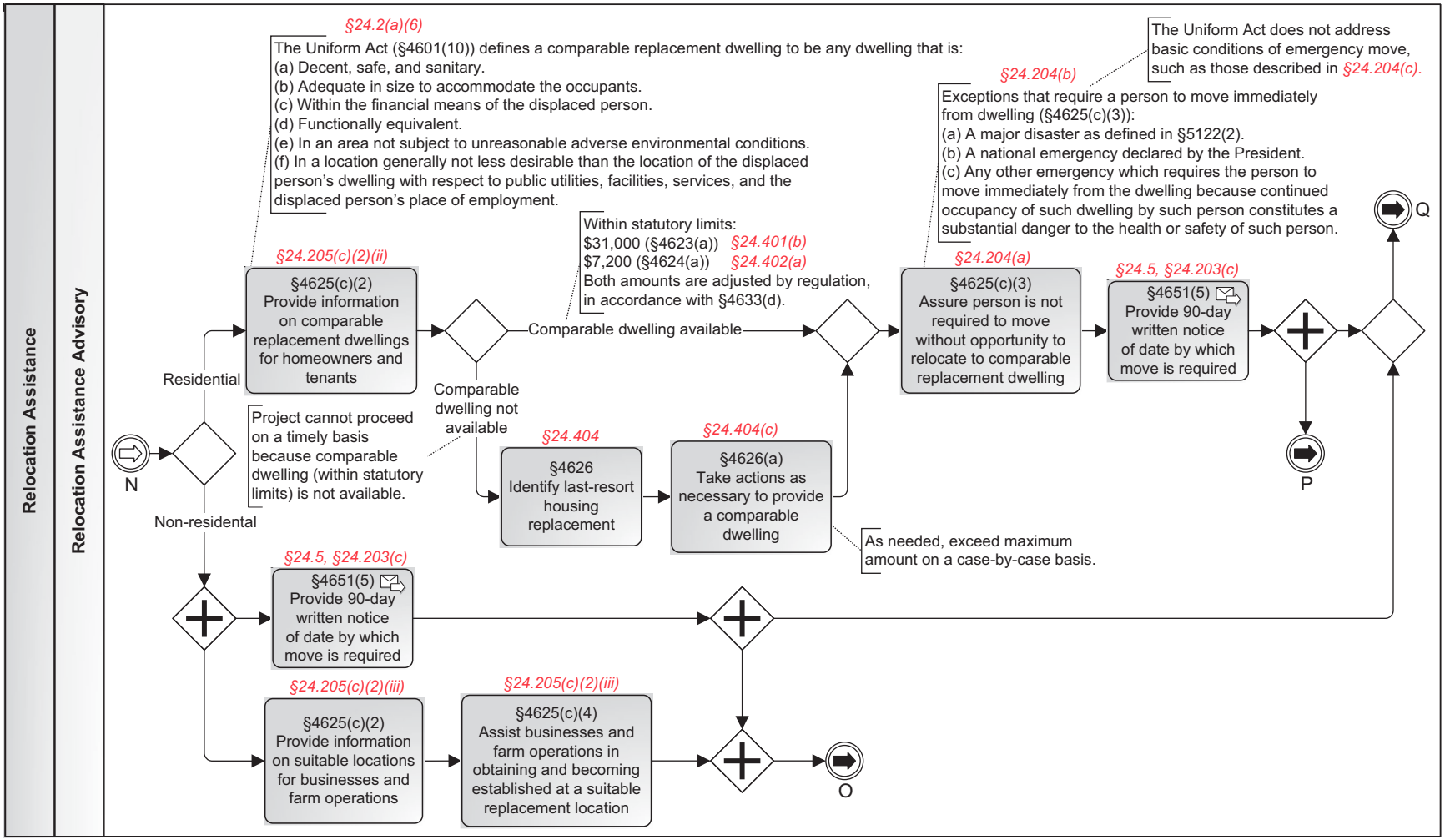


Figure 35. Real property acquisition according to the Uniform Act—relocation assistance (relocation assistance advisory—Part 2).

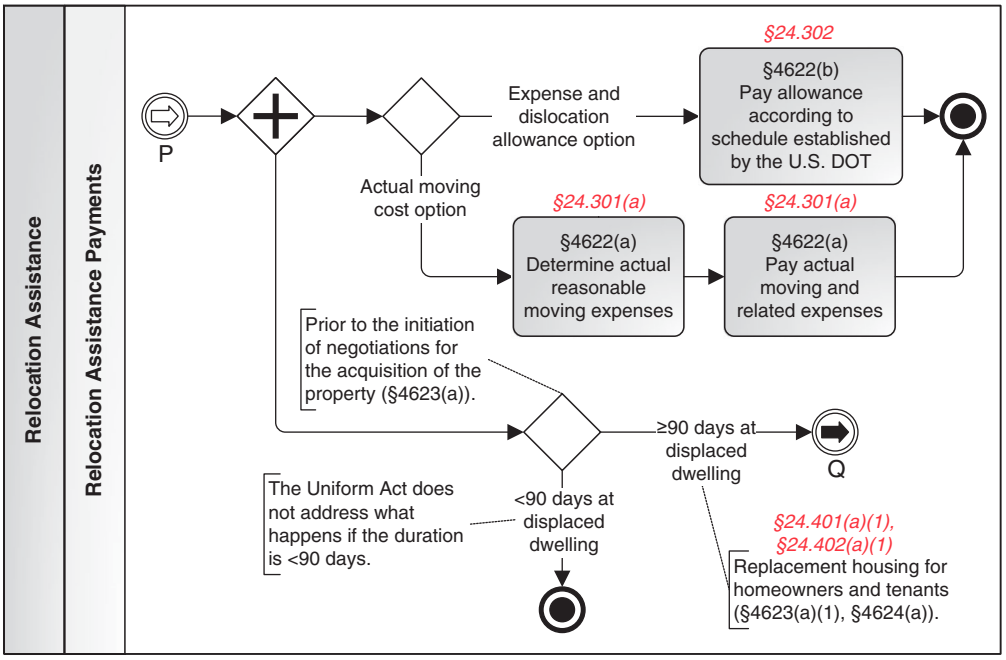


Figure 36. Real property acquisition according to the Uniform Act—relocation assistance (relocation assistance payments—residential—Part 1).

(*continued from page 51*)
the entire process or that refer to other existing laws). For completeness, Figure 40 lists provisions in the Uniform Act that might pertain to the entire process, and Figure 41 lists provisions in the Uniform Act that refer to other existing laws.

MAP-21 introduced several provisions designed to accelerate project delivery and promote efficiency and effectiveness in the process. Provisions related to the acquisition of real property included amendments to the Uniform Act and 23 U.S.C. Figure 42 lists the amendments to the Uniform Act in MAP-21. These amendments address topics such as adjustment of relocation payments, management of the acquisition and relocation program, interagency agreements, and payments. The overall goal of these amendments was to add flexibility to the process (e.g., by increasing the maximum allowable payment for relocation and by allowing the adjustment of the maximum payment amounts by regulation). The figures presenting information about the Level 1, Level 2, and Level 3 models (Figure 23 through Figure 39) reflect the MAP-21 amendments to the Uniform Act.

Figure 43 lists sections of 23 U.S.C. that MAP-21 amended. These amendments address topics such as expediting project delivery and early acquisition of real property (e.g., by revising the conditions under which real property may be acquired before completion of the environmental review). These conditions vary depending on whether the state DOT seeks federal funding or only uses state funding. Appendix C includes a more detailed description of the impacts of MAP-21 on project development and delivery.

It is worth noting that Uniform Act provisions do not address every aspect of the real property acquisition process. For example, the Uniform Act does not prescribe interactions between the project development and delivery process and the real property development and delivery process, including location(s) along the project development process where real property acquisition activities could or must start. Similarly, Uniform Act provisions do not explicitly address the following:

- Encouragement to begin real property activities (other than relocation) earlier in the process.
- Situations in which LPAs acquire property.
- Ownership by businesses of properties that are being acquired.
- Situations involving the unit rule concept in relation to the various physical components of real estate.
- Handling of mobile homes and outdoor advertising signs (particularly off-premise signs), as real or personal property. In the case of outdoor advertising signs, a common issue is how to separate the acquisition of the sign itself from the acquisition of the leasehold interest of the sign company (which pertains to the specific sign location, not the entire company).

Notice also that Uniform Act provisions do not explicitly address appraisal standards and scope of work, and Uniform Act provisions do not explicitly address the updating of offers of just compensation.

(*text continues on page 65*)

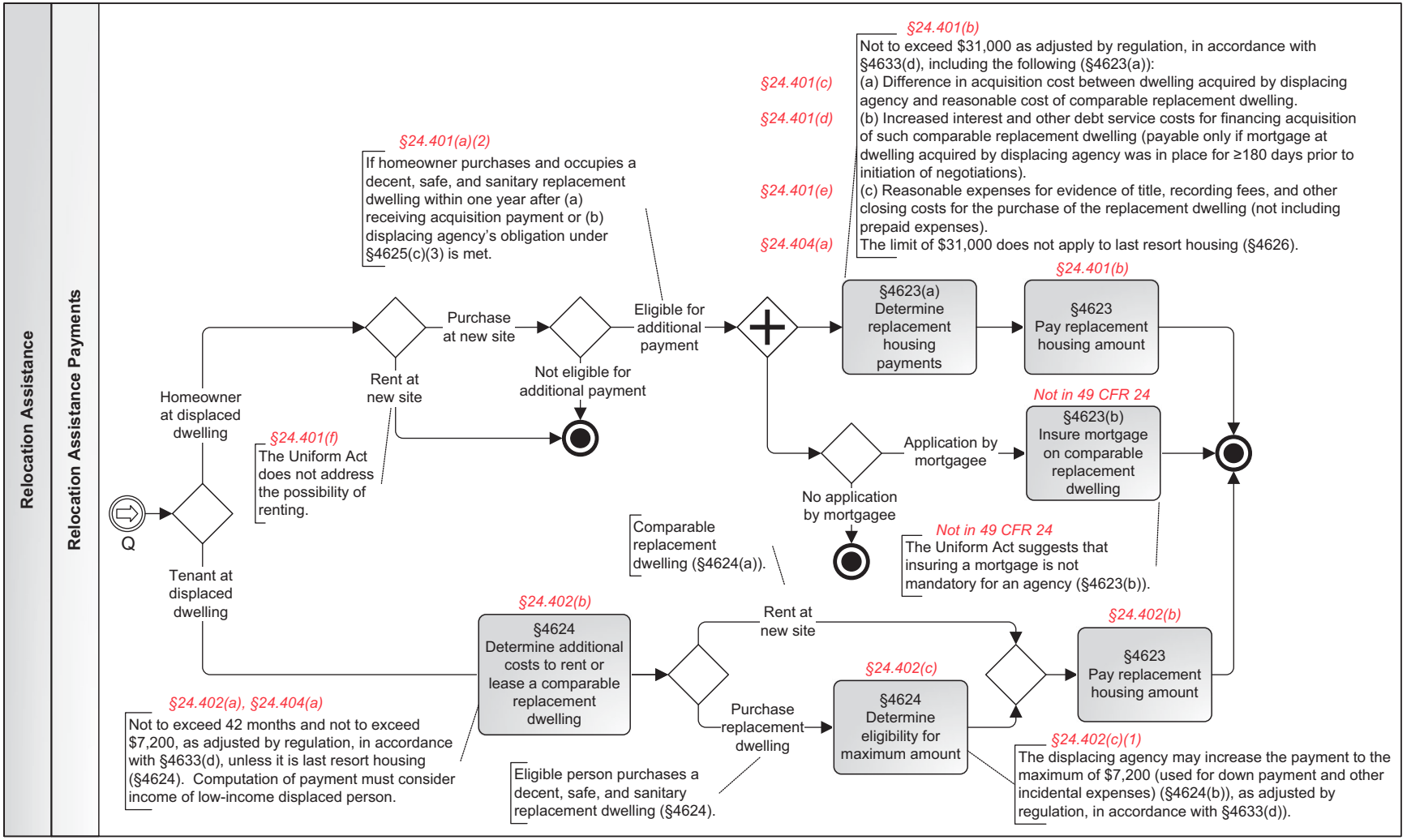


Figure 37. Real property acquisition according to the Uniform Act—relocation assistance (relocation assistance payments—residential—Part 2).

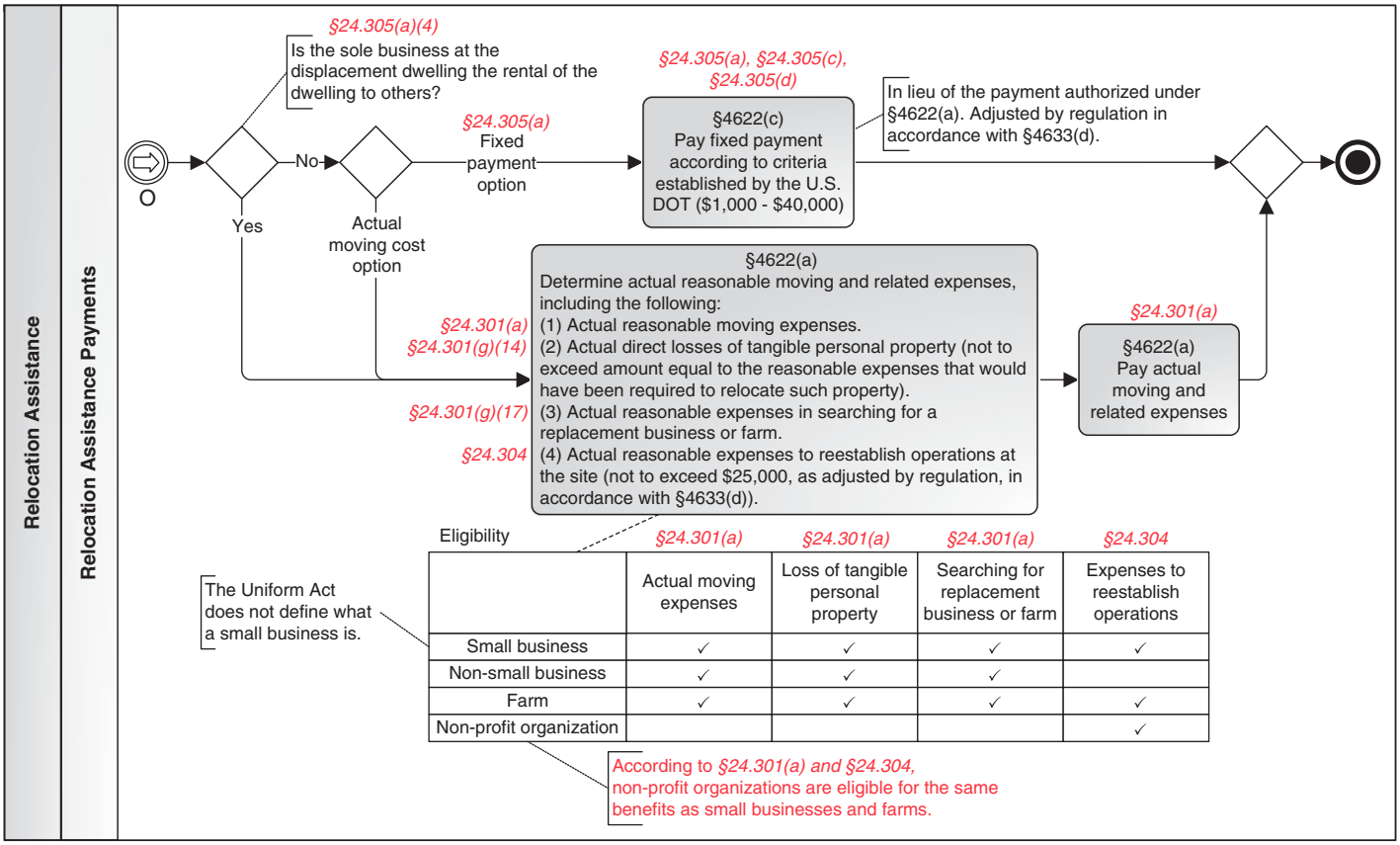


Figure 38. Real property acquisition according to the Uniform Act—relocation assistance (relocation assistance payments—non-residential).

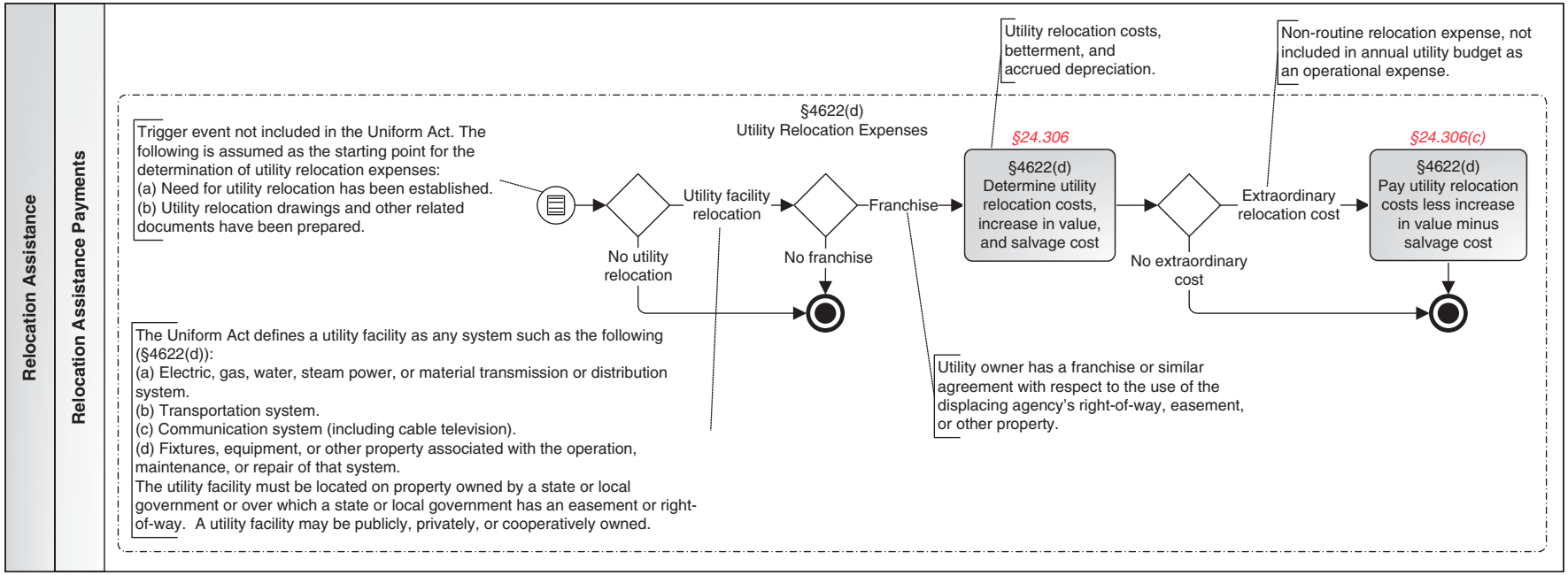


Figure 39. Real property acquisition according to the Uniform Act—relocation assistance (utility relocation expenses).

42 USC 4601 et seq. Provision	49 CFR 24 Provision
§4604. State agency certification provisions.	*§24.601, §24.602, §24.603*
§4621(b), §4621(c)(2). Applicability of policy when there is federal financial assistance to ensure fair and equitable treatment of displaced persons.	*§24.101(b), §24.1(a), §24.1(b)*
§4621(c)(1). Take appropriate actions to minimize waste, fraud, and mismanagement.	*§24.4(c)*
§4621(c)(3). Coordinate with housing programs for economically disadvantaged persons.	*§24.205(c)(2)(v)*
§4625(d). Displacing Agency: Coordinate relocation activities with other federal, state, or local agencies.	*§24.205(d)*
§4625(e). Federal agencies: Select implementation procedures if two or more federal agencies provide financial assistance.	*§24.6*
§4627. State required to furnish real property incident to federal assistance.	*No reference found in 49 CFR 24*
§4628. State acting as agent for Federal program.	*No reference found in 49 CFR 24*
§4629. Public works programs and projects of District of Columbia government and Washington Metropolitan Area Transit Authority.	*No reference found in 49 CFR 24*
§4630. Federal agency: Approve grant, contract, or agreement with displacing agency only after receiving satisfactory assurances that §4622, §4623, and §4625 will be met.	*§24.4(a), §24.4(b)*
§4631(a). Cost to displacing agency; eligibility.	*23 CFR §710.103. No reference found in 49 CFR 24*
§4631(b). Comparable payments under other laws.	*§24.3*
§4631(c). Agreements prior to January 2, 1971.	*No reference found in 49 CFR 24*
§4632. Displacing Agency: Enter into contracts to provide relocation assistance advisory services.	*23 CFR §710.201(h). No reference found in 49 CFR 24*
§4633. U.S. DOT Responsibilities: Develop, publish, and issue regulations to carry out Uniform Act provisions. Provide information developed with the Attorney General on proper implementation of §4625. Ensure that displacing agencies implement §4605 fairly and without discrimination. Ensure that relocation assistance activities are coordinated with low-income housing assistance programs or projects. Monitor implementation of Uniform Act provisions.	*§24.1* *No reference found in 49 CFR 24* *§24.603(d)*
§4633(c). Federal agency: Applicability of policy to the Tennessee Valley Authority and the Rural Electrification Administration.	*§24.401(a)*
§4635. Federal agency: Make or approve loans for planning and obtaining federally insured mortgage financing for rehabilitating or constructing housing for displaced persons.	*§24.404(c)(1)(iv), §24.205(b)*
§4638. Administrator of General Services: Transfer surplus real property to a state agency for the purpose of providing replacement housing.	*No reference found in 49 CFR 24*
§4655. Federal agency: Approve grant, contract, or agreement with acquiring agency only after receiving satisfactory assurances that real property will be guided by §4651 and §4652 to the greatest extent practicable under State law, and that §4653 and §4654 will be met.	*§24.4*

Figure 40. Real property acquisition according to the Uniform Act—other provisions.

42 USC 4601 et seq. Provision	49 CFR 24 Provision
§4602. Condemnation proceedings under the power of eminent domain. No element of value or damage not in existence between 01/02/1971.	*No reference found in 49 CFR 24*
§4603 (Added to 42 USC 61 by Public Law 93-477). Additional appropriations in connection with National Park System: up to $8,400,000 in addition to provisions in Public Law 92-272. Not displaced person provision.	*§24.2(a)(9)(ii)(J)*
§4621(c)(4). Consistency with Title VIII of Civil Rights Act of 1968 (Public Law 90-284) and Title VI of Civil Rights Act of 1964 (42 USC 2000d).	*§24.8(b), §24.8(c)*
§4622. Compliance with federal laws regarding utility relocations.	*§24.306(a)(1), §24.306(a)(2), §24.306(a)(4*
§4636. No payment considered income for 26 USC or for eligibility under the Social Security Act (42 USC 301).	*§24.209*
§4651(4). Deposit in court funds to satisfy the award of compensation, in accordance with 40 USC 3114(a) through (d).	*§24.102(j)*
§4654(c). Claims against the United States, in compliance with 28 USC 1346(a)(2) or 1491.	*No reference found in 49 CFR 24*

Figure 41. Real property acquisition according to the Uniform Act—compliance with other existing laws.

MAP-21 Provision	42 USC 4601 et seq. Provision
§1521(a)(1)	§4622(a)(4). Increase in the maximum eligible amount of a payment for reestablishment expenses for nonresidential displacees.
§1521(a)(2)	§4622(c). Increase in the maximum eligible amount for the fixed “in lieu” payment for nonresidential displacees.
§1521(b)	§4623(a)(1). Increase in the maximum replacement housing payment for displaced homeowners. Elimination of the 90-180 day homeowner category.
§1521(c)(1)	§4624(a). Increase in the maximum rental assistance payment for displaced tenants.
§1521(c)(2)	§4624(b). Elimination of the 90-180 day homeowner category.
§1521(d)(1)	§4633(b)(4). Federal agencies: Provide to the lead agency a summary report describing the activities conducted by the federal agency.
§1521(d)	§4633(d). Lead agency: Adjustment of payments. The head of the lead agency may adjust, by regulation, the amounts of relocation payments if an adjustment is indicated after determining the cost of living, inflation, or other factors.
§1521(d)	§4634(a). Federal agencies: Agency capacity. Ensure adequate resources to manage and oversee their relocation and acquisition program.
§1521(d)	§4634(b). Federal agencies: Interagency agreements. Enter into a memorandum of understanding with lead agencies to provide personnel with periodic training; address ways in which the lead agency may provide assistance to the Federal agency relating to compliance with the Act; and address the funding of activities provided by the lead agency.
§1521(d)	§4634(c). Federal agencies: Interagency payments. Transfer necessary funds to the lead agency to support the activities described in §4634(b).

Note: MAP-21 amended the Uniform Act. As of this writing, the U.S. Code had not been updated to reflect those changes. The provisions in 42 U.S.C. 4601 et seq. are assumed based on the mapping between the Uniform Act and 42 U.S.C. 4601 et seq. provisions in Table 9.

Figure 42. Anticipated amendments to 42 U.S.C. 4601 et seq. from MAP-21.

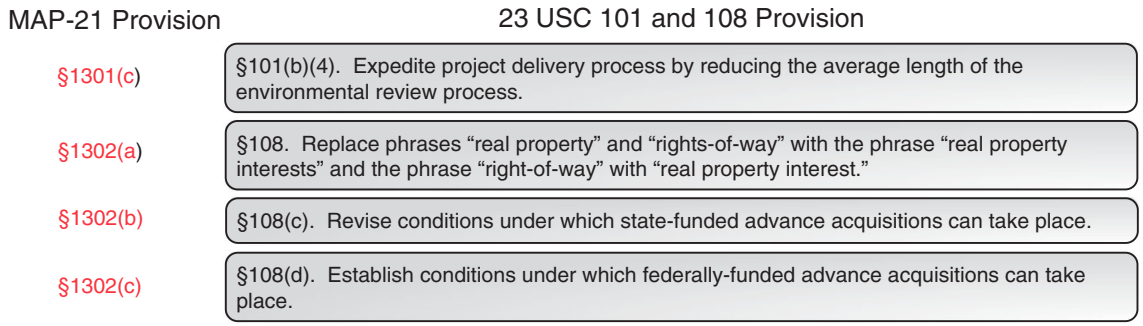


Figure 43. Amendments to 23 U.S.C. 101 and 108 from MAP-21.

(*continued from page 59*)

Uniform Act provisions also do not explicitly address mediation before condemnation proceedings.

Developing the Level 3 unencumbered property acquisition and relocation assistance model involved completing the following activities:

- Analyzing each provision in the three subchapters of 42 U.S.C. 4601 et seq.: Subchapter I (General Provisions), Subchapter II (Uniform Relocation Assistance), and Subchapter III (Uniform Real Property Acquisition Policy).
- Developing a graphical representation of 42 U.S.C. 4601 et seq. by mapping each provision to its corresponding location on the transportation project development and delivery process, taking into consideration functional areas and interdependencies.
- Examining opportunities for improvement or optimization in the property acquisition and relocation assistance process (e.g., by determining activities that could occur in parallel as opposed to sequentially, regardless of regulation considerations, and by highlighting integration points between the property acquisition and relocation assistance process and the overall project development and delivery process).
- Comparing the Uniform Act and the federal regulations (specifically 49 CFR 24 and 23 CFR 710) to identify provisions in the regulations that are not required in the act.

Figure 44 shows the various graphical elements used for developing the Level 3 model, including pools, swim lanes, groups, activities, sequence flows, gateways (both exclusive and parallel), and events (start, intermediate, and end).

The Uniform Act does not follow or provide for a sequential or chronological order of activities. Therefore, to understand Uniform Act provision interdependencies, it was critical to place each provision in a correct sequential order with respect to other provisions in the law (and with respect to other elements in the transportation project development and delivery process). This process enabled the development of a sequential model that could be used to identify critical paths and interdependencies (according to the law). It also enabled the development of a reference work schedule for real property acquisition and relocation assistance activities, which is discussed in Chapter 4.

For consistency with the Level 1 and Level 2 models, the Level 3 real property acquisition and relocation assistance model uses the following activity sequence:

- Valuation:
  - Valuation planning (includes determining whether an appraisal is necessary).
  - Appraisal or waiver valuation.
  - Just compensation.
- Acquisition:
  - Written offer.
  - Negotiation.
  - Condemnation.
  - Post acquisition (includes taking possession and beginning to manage the property).
- Relocation assistance:
  - Relocation assistance eligibility determination.
  - Relocation assistance advisory.
  - Relocation assistance payments.

The Uniform Act does not explicitly define the starting point for the real property acquisition process. For consistency with other requirements in the transportation project development and delivery process, the model assumes the following conditions to start the real property acquisition process:

- Authorization to acquire property has been received.
- Right-of-way map and other related documents have been prepared.
- Environmental document has been prepared and approved, except under certain conditions (as required by the appropriate laws and regulations).

The Uniform Act also includes a provision (§4625[a]) that encourages early planning to anticipate displacements and provide for the resolution of problems to minimize adverse

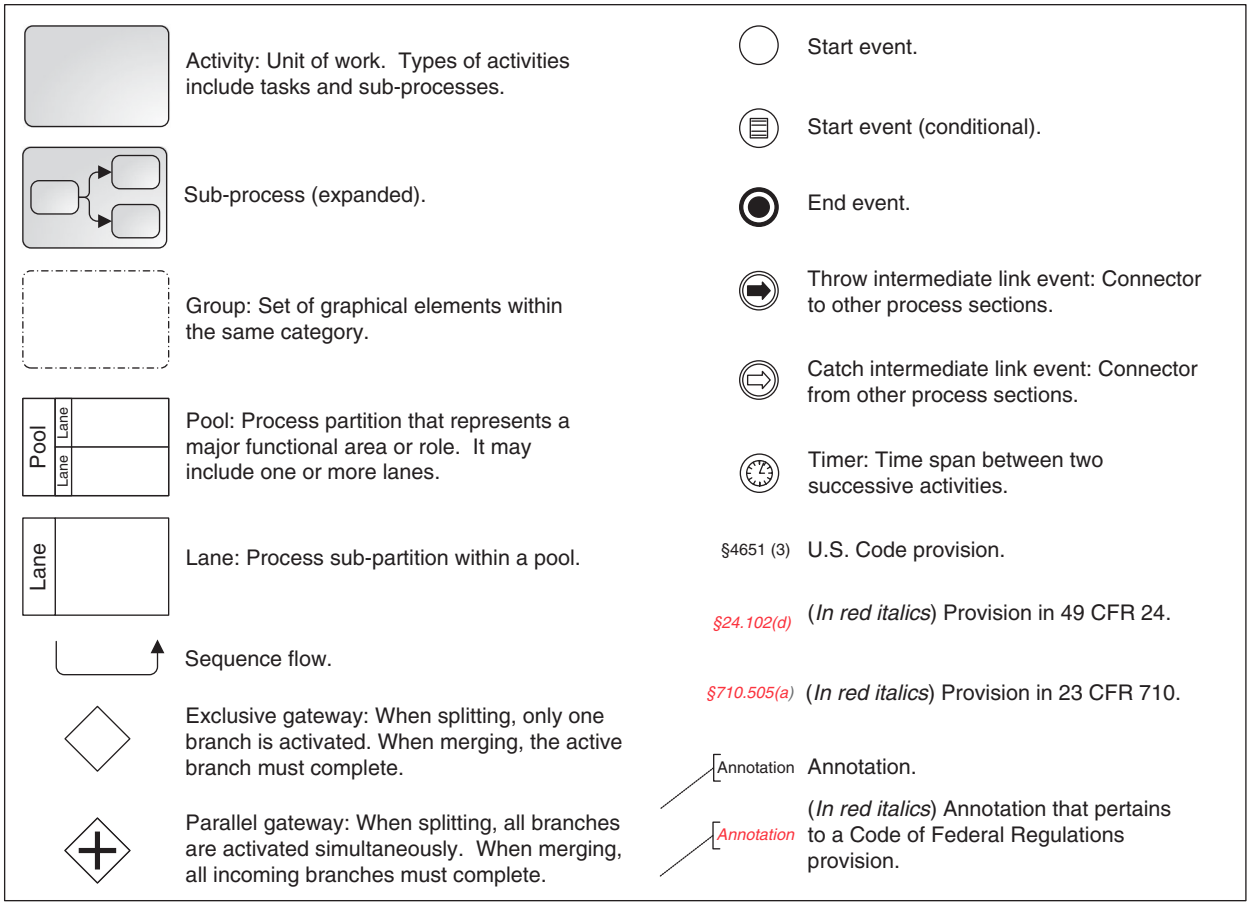


Figure 44. BPMN-based graphical elements used in the Level 3 property acquisition and relocation assistance model.

impacts on displaced persons and expedite project completion. This provision is not prescriptive with respect to timing or effort. For simplicity, Figure 32 shows provision §4625(a) at the beginning of the relocation assistance pool, which is assumed to start after the authorization to acquire real property has been received. Strictly speaking, §4625(a) could start earlier (e.g., during the preliminary design phase or even during the planning and programming phase).

Relocation assistance advisory services include all activities necessary to provide advisory services to displaced persons. Those services also include providing a 90-day written notice of the date by which the move is required. The model makes a distinction between residential and non-residential services, while recognizing that certain services must be available to all displaced persons who are eligible for advisory services. The law also includes a provision to require a person to move immediately from a dwelling in the case of a major disaster or emergency (Figure 35).

As Figure 39 shows, provision §4622(d) in 42 U.S.C. 4601 et seq. deals with the reimbursement of eligible utility relocations that are needed in connection with a transportation project. The law does not address the issue of determining whether a utility relocation is needed (other laws and regulations address this issue). Provision §4622(d) clarifies that eligible costs for reimbursement should take into consideration the cost to relocate the affected utility facilities, any increase in the value of the new utility facility above the value of the old utility facility, and any salvage value derived from the old utility facility.

The real property acquisition process model as depicted in Figure 23 through Figure 39 is self-explanatory by enabling readers to easily verbalize activities, sequence flows, gateways (both exclusive and parallel), events (start, intermediate, and end), annotations, and labels, as described in Figure 44. To make the model as understandable as possible without the need for additional text, the model uses the following features and rules:

- Each activity box includes (within the box) a reference to a provision in the Uniform Act (as codified in 42 U.S.C. 4601 et seq.) along with a short phrase that summarizes that provision. For example, in Figure 28, the first activity box includes a reference (within the box) to provision §4651(3), which refers to the preparation of a written offer. This strat-

egy ensures that the graphical model is readable and compact, while providing a reference to the full provision in the act, which is widely available in a variety of formats.

- For completeness, the model includes references to specific provisions in 49 CFR 24 and 23 CFR 710 (shown in red, typically above activity boxes) if they match a corresponding provision in the act. The match need not be word-for-word. Rather, if the intent and purpose is the same, the model includes a reference to the corresponding provisions. For example, in Figure 28, the first activity box includes references to §24.5 and §24.102(d) (in red, above the box), which match the intent and purpose of provision §4651(3) in 42 U.S.C. In Visio all references to regulations—both the provisions, such as §24.102(c), and the corresponding annotations—are in red and on a different layer that can be easily turned on or off as needed. As a result, figures similar to Figure 25 through Figure 39 but without any references to 49 CFR 24 and 23 CFR 710 can be easily generated.
- All activities that belong to the same function are located within the same swim lane. For example, all activities related to appraisals (such as visiting and inspecting the property, conducting the appraisal, and developing an approved appraisal) are located within the appraisal or waiver valuation swim lane. A similar consideration applies to all the swim lanes that belong conceptually to the same pool. For example, the valuation planning swim lane, the appraisal and waiver valuation swim lane, and the just compensation swim lane are fully contained within the valuation pool. Figure 44 provides a definition and a mechanism for differentiating between lanes and pools.
- Although the model does not provide a timeline of activities, activity dependency is expressed from left to right (i.e., activities that depend on other activities are generally located to the right of the activities on which they depend). In general, dependencies are depicted using sequence flow arrows. To establish just compensation, for example, an approved appraisal must be developed first (or an exemption can be made if the property has an anticipated low fair market value). In the model (Figure 27), the box that represents the establishment of just compensation is located to the right of the box that represents the development of the approved appraisal (a sequence flow arrow connects both activities). This strategy enables the identification and visualization of critical paths within the model, which in turn facilitates the identification of potential opportunities for streamlining and optimization.
- Although activity dependencies are expressed from left to right in the model, hypothetical vertical cross sections *do not* imply that all activities that are crossed need to take place at the same time. This is particularly true in the case of activities that originate from the same exclusive gateway decision point (which, by definition, only allows one of the branches to be activated). However, even in the case of parallel gateway decision points (which, by definition, allow all branches to be activated simultaneously), all the diagram shows is that the parallel activities involved originated from the same common point and *could* take place simultaneously (if conditions are appropriate), not that the activities *must* take place at the same time.

Summary

This chapter summarized the work completed to identify existing project development and delivery workflows and develop a reference (or typical) model of the transportation project development and delivery process at state DOTs. The chapter outlined different approaches to visualize the process and described a generic model based on a review of processes and documentation at most state DOTs around the country.

Traditional approaches have normally assumed a linear process with little or no overlap between activities. In reality, the project development process is not linear; it can vary substantially depending on factors such as project type, physical characteristics, urgency, funding, and delivery method. The research team gathered a substantial amount of information from state DOTs in relation to items such as project development (37 states), real property acquisition and property management (42 states), utility relocation (32 states), and organization charts (45 states).

A high-level review of the gathered documentation indicated that many similarities exist in the way state DOTs visualize and manage their transportation project development and delivery process but that, despite the similarities, state DOTs have developed a wide range of unique variations to conceptualize and manage process components and to visualize and document their process. The level of detail in the written documentation varies substantially, from highly detailed prescriptive descriptions to brief documents that focus primarily on milestones but provide little information about the process. Many states are automating the visualization and documentation of their process (e.g., by using scheduling software to develop typical or project-specific timeline views of the process).

Based on the gathered documentation, the research team developed a three-level reference (or typical) model of the transportation project development and delivery process. Level 1 provides a high-level depiction of the entire process that considers both phases and functional areas. Level 2 provides an intermediate-level depiction of the entire transportation project development and delivery process, and Level 3 provides a detailed depiction of the real property acquisition process according to the Uniform Act. The three versions of the model also are provided in CRP-CD 154 in a standalone Visio 2010 file and in PDF.

These models correspond to the traditional design-bid-build project development and delivery method. Other methods could involve different activity sequences. Regardless of project delivery method, laws and regulations govern when certain critical activities can take place. For example, with certain exceptions, real property acquisition can take place only after the environmental documentation has been approved.

Examples of variations from the generic process illustrate differences in the way state DOTs conceptualize their project development and delivery process. The chapter also summarized the systematic approach taken to develop a detailed graphical representation of a reference real property acquisition and relocation assistance model using BPMN.

Although the Uniform Act does not follow a sequential or chronological order of activities, to document interdependencies it was critical to place each provision of the Uniform Act in a correct sequential order with respect to other provisions in the law (and with respect to other elements in the transportation project development and delivery process). A series of figures were created to present the reference model in a self-explanatory way, enabling readers to easily identify activities, sequence flows, gateways (both exclusive and parallel), events (start, intermediate, and end), annotations, and labels. In the figures, all activities that belonged to the same function were located within the same swim lane or pool, and activity dependency was expressed from left to right and depicted using sequence flow arrows. The identification and visualization of critical paths within the model facilitated the analysis of potential opportunities for streamlining and optimization of a selected set of activities of interest to the transportation community.

A review of Uniform Act provisions in relation to the overall project development and delivery process and actual practice highlighted a few major areas that the act does not address or cover.

CHAPTER 4

Reference Real Property Acquisition and Relocation Assistance Work Schedule

Introduction

This chapter describes a reference work schedule that integrates real property acquisition and relocation assistance activities with the rest of the transportation project development and delivery process. The work schedule incorporates the requirements and procedures in the Uniform Act (as represented in the Level 3 model shown in Chapter 3, Figure 23) into the reference (or typical) transportation project and delivery process (as represented in the Level 2 model shown in Chapter 3, Figure 11). Its purpose is to provide a graphical representation of real property acquisition and relocation assistance scheduling activities within the context of both the Uniform Act and the typical requirements of a transportation project.

To provide context, this chapter starts with a discussion about typical project durations. This discussion covers the entire project development and delivery process but focuses primarily on typical durations associated with real property acquisition and relocation assistance.

Project Duration

Transportation Project Development and Delivery Process

Because every project is unique, determining the duration of a single typical project is extremely difficult. Some sources in the literature provide accounts of typical durations that are based mainly on professional judgment. For example, in 2002 the U.S. General Accounting Office (GAO) prepared testimony to the U.S. Senate on the timely completion of highway projects that receive federal financial assistance from FHWA (*46*). According to the GAO report, based on FHWA estimates, it usually takes from 9–19 years to plan, gain approval for, design, and build a new, major, federally funded highway project that has significant environmental impacts. The time breakdown is as follows:

- Planning: 4–5 years.
- Preliminary design and environmental review: 1–5 years.
- Final design and real property acquisition: 2–3 years.
- Construction: 2–6 years.
- **Total: 9–19 years.**

The time required to complete a project is a function of factors such as project size and complexity, as well as public interest in the project. Projects could take as few as 3 years or as many as 20 years or more to complete. The report provided some information about six new highway construction projects (Table 10). These projects ranged from a $1.7 million project in Florida to upgrade a dirt road to a two-lane paved road (which took 8 years to complete) to a $50 million project to build a six-lane, 15-mile divided highway in Texas that took over 15 years to complete. Information about the duration of the planning phase for these projects was not available.

In 2007, AASHTO released a report highlighting the need to accelerate project delivery (*47*). According to this report, a major transportation project can take 10 years to 15 years from beginning to end, even without controversial issues that can slow the project further. Typical durations are as follows:

- Planning: 2–3 years.
- Environmental process: 4–6 years.
- Detailed design: 2–3 years.
- Right-of-way acquisition and utility relocation: 1–2 years.
- Construction: 2–3 years.
- **Total: 10–15 years.**

Real Property Acquisition and Relocation Assistance

Of particular interest to this research was the time it takes to acquire real property for a transportation project. This section provides a few examples in which state DOTs have attempted to derive metrics to determine the duration and impact of their real property acquisition process.

Table 10. Duration of six sample projects in California, Florida, and Texas (adapted from [*46*]).

Project	Total Cost ($ millions)	Project Duration				
		Planning	Preliminary Design and Environmental Review	Final Design and Real Property Acquisition	Construction	Total*
Fort Green/Ona Road (Florida)	1.7	N/A	2 years, 7 months	4 years, 5 months	1 year, 6 months	8 years, 3 months
State Road 115 (Florida)	2.2	N/A	1 year, 7 months	1 year, 2 months	2 years, 6 months	6 years, 7 months
State Highway 146 (Texas)	16.7	N/A	4 years, 4 months	4 years, 5 months	2 years, 10 months	9 years, 8 months
State Route 168 (California)	29.9	N/A	3 years, 8 months	3 years, 4 months	2 years, 3 months	9 years, 4 months
State Route 198 (California)	42.9	N/A	4 years	6 years, 8 months	3 years, 6 months	14 years, 3 months
U.S. Highway 290 (Texas)	50.1	N/A	9 years, 8 months	10 years	3 years, 1 month	15 years, 3 months

*The total time may not equal the sum of all phases, for example, because of phase overlap or because of gaps between phases.

Florida

Figure 45 shows the typical real property acquisition schedule depicted in the *Project Management Handbook* at the Florida DOT (*48*). The Florida DOT highlights that the time involved in real property acquisition activities depends on several factors, including the number of parcels and the complexity of each situation. As Figure 45 shows, the Florida DOT estimates that the length of time from the beginning of appraisals to the right-of-way certification can be 18–24 months.

Minnesota

Figure 46 shows a real property acquisition schedule that the Minnesota DOT (Mn/DOT) developed to represent typical acquisition conditions without a significant condemnation component. This schedule assumes 18 months, beginning with title searches and ending with direct real property acquisition and relocation before a project goes to letting (*49*). This schedule does not apply to all transportation projects throughout the state. Districts and regional offices have developed similar schedules to suit their needs.

North Carolina

Recently, the North Carolina DOT started using scheduling software to manage the acquisition of real property and to evaluate the impact of changes in certain activities on the North Carolina DOT's ability to complete real property

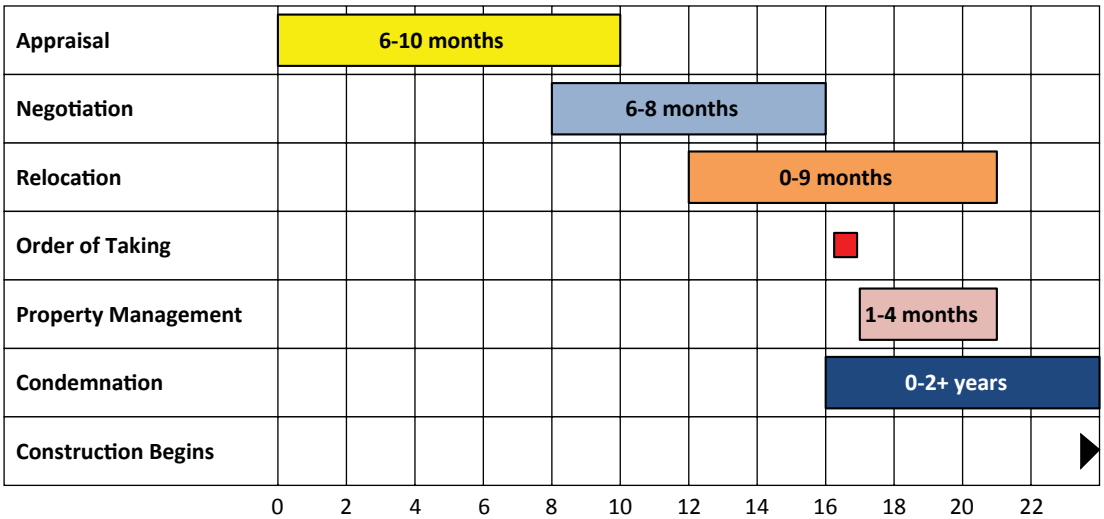


Figure 45. Right-of-way acquisition schedule in Florida (adapted from [48]).

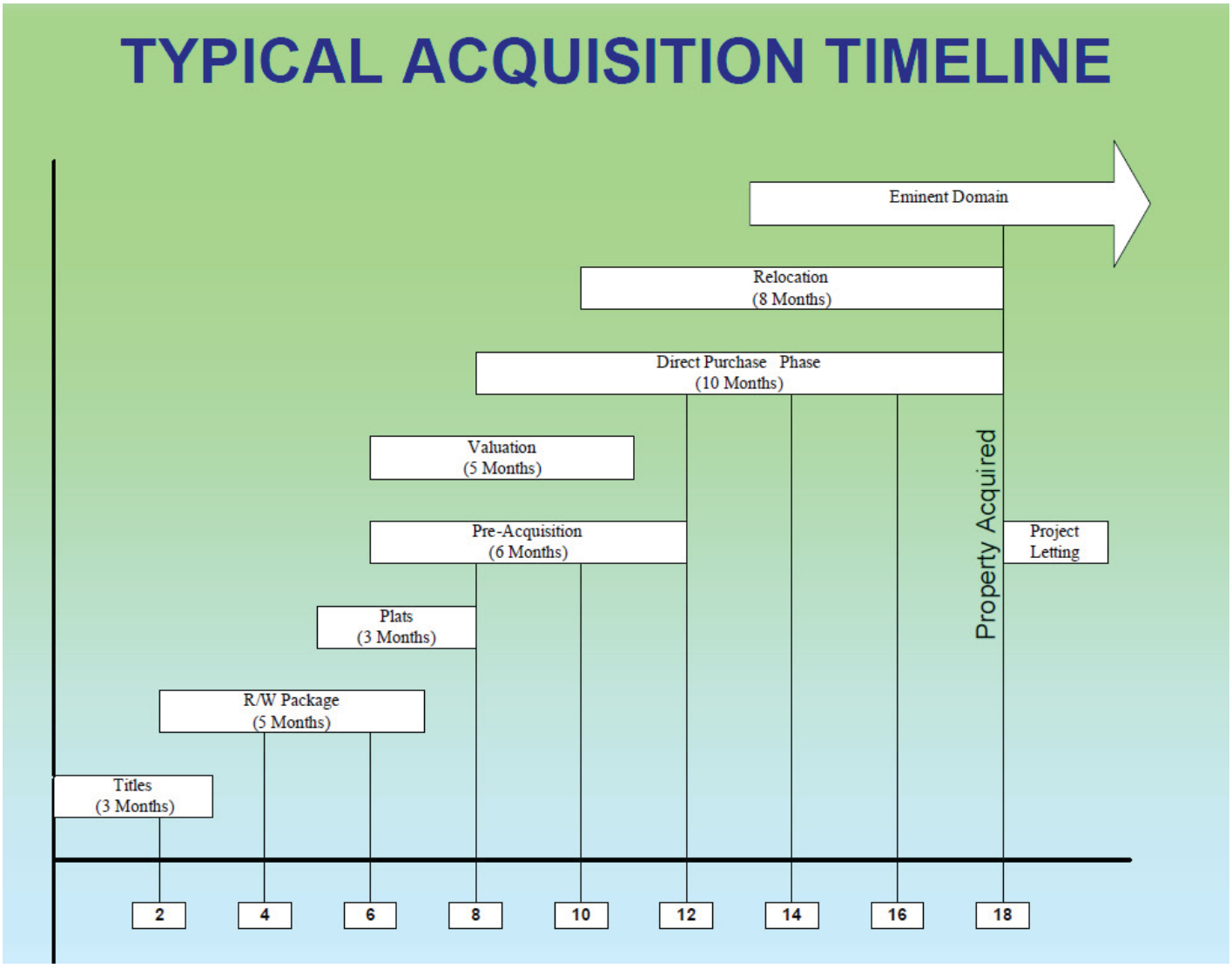


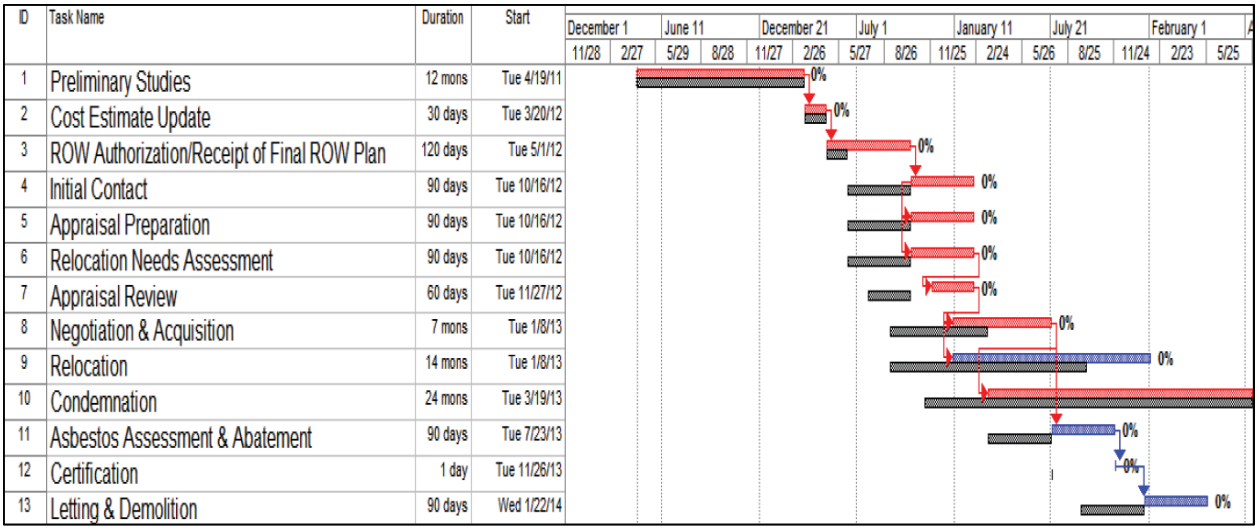
Figure 46. Typical right-of-way acquisition timeline at the Minnesota DOT (49).

acquisition activities on time (*50*). Figure 47 shows a sample schedule of real property acquisition activities that includes both a baseline (with no delays assumed) and a modified schedule. The modified schedule takes into account delays while preparing the right-of-way map (60 days) and delays resulting from the identification of utility facilities with an impact on right-of-way requirements (30 days). Both types of delays affect right-of-way authorization and the receipt of the right-of-way map. Because this activity is on the critical path, the net impact of the delay is 120 additional days to acquire and deliver real property for the project.

Ohio

As mentioned earlier in this report, the Ohio DOT has identified five different project paths, depending on project size, complexity, and/or potential environmental impacts (see Table 6 in Chapter 3). The Ohio DOT has developed sample Gantt charts for typical Path 2 and Path 3 projects. The project schedule templates depict key project activities and their interdependencies. For example, the typical duration of a sample Path 3 project is 2 years and 7 months. This duration covers the period between the project start-up meeting that takes place at the beginning of the (project-specific) planning phase and the end of the final engineering phase.

Figure 48 shows the real property acquisition component associated with the schedule template for a sample Path 3 project. The total duration of the real property acquisition phase is 1 year, beginning with the authorization of preliminary right-of-way acquisition activities for total takes and ending with the clearance of right-of-way. Notice that the Ohio DOT schedule template does not include an activity for relocation assistance services. The template assumes 60 days for preparing a preliminary right-of-way map (including 30 days



Note: Gray represents baseline conditions (no delays assumed); red represents a modified schedule that takes into consideration delays that result from design changes and utility activities. Blue represents tasks that are not on the critical path of a project.

Figure 47. Sample real property acquisition schedule in North Carolina (50).

for review) in preparation for the environmental review and 75 days for preparing the final right-of-way map (including 30 days for review). The template also assumes that the acquisition activity ends before the right-of-way certification, which happens before sending the final project plans to the central office in preparation for letting.

To assist in the identification of potential real property and surveying issues that might have an impact on project development and delivery, the Ohio DOT's project initiation package includes a list of critical real property-related questions, as shown in Table 11.

Texas

In 2005, the Texas DOT completed a research project to evaluate delays in the acquisition of real property and utility relocations (*51*). For real property acquisition, the research included an evaluation of the following milestones:

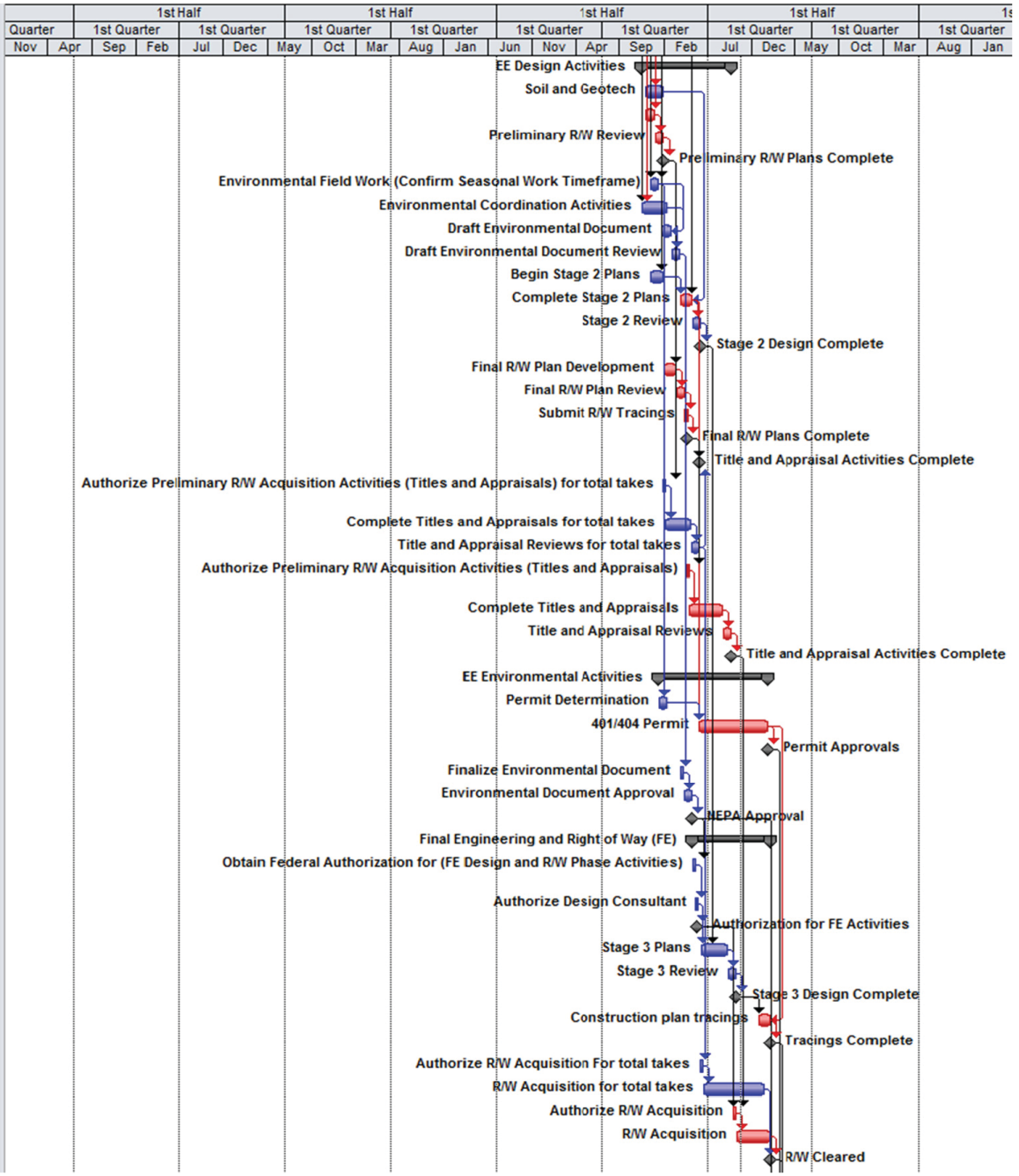
- Right-of-way release date (Milestone 1).
- Initial appraisal date (Milestone 2).
- Appraisal approval date (Milestone 3).
- Negotiation end date (Milestone 4).
- Condemnation process start date (Milestone 5).
- Preparation and submission of request for condemnation proceedings (Milestone 6).
- Minute order for condemnation proceedings approved (Milestone 7).
- Possession of real property date (Milestone 8).

For the analysis, the researchers evaluated data from 45 completed projects that had at least 10 parcels per project. The average number of parcels per project was 36. A first subsample, which excluded parcels the researchers labeled as critical path parcels, had a sample size of 124 parcels, of which 12 parcels (10 percent) were acquired through condemnation. For this subsample, the mean time to move from right-of-way release to possession of the property was 18 months, and the mean time to move from the initial appraisal to possession of the property was 11 months. The researchers also observed a wide dispersion in the data. For example, from right-of-way release to possession of the property, the standard deviation and range were 16 months and 69 months, respectively. From the initial appraisal to possession of the property, the standard deviation and range were 13 months and 59 months, respectively.

The parcels the researchers labeled as critical path parcels corresponded to the last parcel acquired before a project was let (and could presumably provide an indication that the parcel was the most difficult or resource-consuming to acquire). The sample size under this category was 45 parcels, of which 29 parcels (71 percent) were acquired through condemnation. The mean time to move from right-of-way release to possession of the property was 33 months, and the mean time to move from the initial appraisal to possession of the property was 24 months. The dispersion around the mean for this subsample was also quite significant.

The researchers also noted other factors affecting the time to acquire real property. These factors were (a) the total number of parcels in a project (projects with fewer parcels had faster acquisition times), and (b) right-of-way staff size (districts with fewer agents tended to spend longer acquiring property). The researchers also noted that districts with larger acquisition budgets tended to take longer to acquire real property, presumably because of work volume and complexity of projects and job requirements.

Task Name	Duration
EE Design Activities	**222 days**
Soil and Geotech	60 edays
Preliminary R/W Plans	30 edays
Preliminary R/W Review	30 edays
Preliminary R/W Plans Complete	**0 edays**
Environmental Field Work (Confirm Seasonal Work Timeframe)	30 edays
Environmental Coordination Activities	90 edays
Draft Environmental Document	30 edays
Draft Environmental Document Review	30 edays
Begin Stage 2 Plans	45 edays
Complete Stage 2 Plans	45 edays
Stage 2 Review	30 edays
Stage 2 Design Complete	**0 edays**
Final R/W Plan Development	45 edays
Final R/W Plan Review	30 edays
Submit R/W Tracings	5 edays
Final R/W Plans Complete	**0 edays**
Title and Appraisal Activities Complete	**0 days**
Authorize Preliminary R/W Acquisition Activities (Titles and Appraisals) for total takes	5 edays
Complete Titles and Appraisals for total takes	90 edays
Title and Appraisal Reviews for total takes	30 edays
Authorize Preliminary R/W Acquisition Activities (Titles and Appraisals)	5 edays
Complete Titles and Appraisals	120 edays
Title and Appraisal Reviews	30 edays
Title and Appraisal Activities Complete	**0 days**
EE Environmental Activities	**268 days**
Permit Determination	30 edays
401/404 Permit	240 edays
Permit Approvals	**0 edays**
Finalize Environmental Document	15 edays
Environmental Document Approval	30 edays
NEPA Approval	**0 edays**
Final Engineering and Right of Way (FE)	**193 days**
Obtain Federal Authorization for (FE Design and R/W Phase Activities)	10 edays
Authorize Design Consultant	5 edays
Authorization for FE Activities	**0 edays**
Stage 3 Plans	90 edays
Stage 3 Review	30 edays
Stage 3 Design Complete	**0 edays**
Construction plan tracings	45 edays
Tracings Complete	**0 edays**
Authorize R/W Acquisition For total takes	10 edays
R/W Acquisition for total takes	215 edays
Authorize R/W Acquisition	10 edays
R/W Acquisition	120 edays
R/W Cleared	**0 edays**



Note: Duration in days represents working days. Duration in edays represents elapsed calendar days. Task bars in red represent critical tasks.

Figure 48. Real property acquisition schedule for Sample 3 project (43).

Table 11. The Ohio DOT project initiation package—right-of-way and survey issues (*43*).

RIGHT-OF-WAY/SURVEY ISSUES:	
Indicate if right-of-way or survey issues are present or should be considered during project development. Provide additional comments as needed.	
Design Issue	**Location/Comments**
Will there be any work beyond the existing right-of-way limits?	
Will relocation of residences be involved?	
Will relocation of businesses be involved?	
Will the project require modifying the access control to any properties?	
Identify significant right-of-way encroachments (i.e., large commercial business signs, etc.).	
Will temporary parcels be needed (e.g., for drive work)?	
Will additional right-of-way be needed for utility relocations?	
Are there any specific property owner concerns? If so, list property owners and concerns.	
Are work agreements prohibited for any reason?	
Are there any other right-of-way or survey issues? *Specify*.	

Washington State

As part of Washington State's Government Management Accountability and Performance (GMAP) initiative, the Washington State DOT conducted an evaluation of project delivery risks that included an analysis of elements of risk that might result in delays in the production of right-of-way certifications before projects can be advertised (*52*). The motivation for the analysis was the finding that 20 out of 68 projects that had a real property acquisition element from 2003 to 2005 had letting dates that were delayed because of certification delays. Real property-related factors that played a role in the letting delays of those 20 projects included the following:

- Design changes: eight projects (40 percent), related to issues such as permitting requirements, property owner requests, and design changes late in the design phase.
- Protracted negotiations: seven projects (35 percent), related to issues such as negotiations with railroads, local governments, tribes, and utility owners, as well as the Washington State DOT's reluctance to pursue condemnation.
- Schedule management: four projects (20 percent), related to issues such as inadequate time in the schedule for negotiations, an unanticipated condemnation, difficult negotiations with an out-of-country owner, and a contractor's failure to perform.
- Delayed funding: three projects (15 percent).
- Utility accommodation: two projects (10 percent), related to issues such as delays in identifying existing utility facilities and related real property needs.

Reference Work Schedule

This section describes the reference work schedule that integrates real property acquisition and relocation assistance activities with the rest of the transportation project development and delivery process. The research team developed the reference work schedule in Microsoft Project 2010 format and PDF. Both sets of files are provided as standalone files on CRP-CD 154 to facilitate their dissemination to the transportation community. The Project file can also be easily imported into other commonly used scheduling software platforms, such as Primavera® P6™.

Work Schedule Description

The work schedule includes tasks that represent Level 2 model swim lanes and activities as well as Level 3 model activities. As Figure 49 shows, the WBS is organized into three levels to account for tasks that represent a swim lane (first-level), an individual activity within a swim lane (second-level), or an activity required by the Uniform Act (third-level). Table 12 provides a description of the attribute data fields used for the work schedule. The tasks can be briefly described by level as follows:

- **First-level tasks.** Each task at this level corresponds to a Level 2 model swim lane (e.g., Task 7 corresponds to Relocation Assistance). The relationship is one-to-one, except in the case of the acquisition swim lane, which is divided into two first-level tasks to distinguish activities that happen

(*text continues on page 80*)

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ID	No.	Task Name	Working Days	Start Date	Finish Date
1	1	Definition, Selection, Financing and Scheduling	548 days	1/1/13	2/5/15
2	1.1	Develop long-range transportation plans	1 day	1/1/13	1/1/13
3	1.2	Identify project need and purpose	1 day	1/2/13	1/2/13
4	1.3	Identify project requirements and conduct studies	1 day	1/3/13	1/3/13
5	1.4	Prepare cost estimate and identify funding sources	1 day	1/4/13	1/4/13
6	1.5	Develop/update intermediate and short-range programs	1 day	1/7/13	1/7/13
7	1.6	Authorize project development	1 day	1/8/13	1/8/13
8	1.7	Secure federal, state, and local agreements	60 days	8/7/13	10/29/13
9	1.8	Update project requirements, cost estimate, and schedule	1 day	10/30/13	10/30/13
10	1.9	Authorize project design	20 days	1/3/14	1/30/14
11	1.10	Authorize project construction	10 days	1/23/15	2/5/15
12	2	Alternative Analysis and Preliminary Plans	210 days	1/9/13	10/29/13
13	2.1	Conduct conceptual design meeting	10 days	1/9/13	1/22/13
14	2.2	Collect data for preliminary design	60 days	1/23/13	4/16/13
15	2.3	Obtain permission to enter property	25 days	1/23/13	2/26/13
16	2.4	Develop alternative alignments (preliminary schematics)	80 days	1/23/13	5/14/13
17	2.5	Select preferred alternative and develop geometric schematic	60 days	5/15/13	8/6/13
18	2.6	Conduct value engineering study	30 days	5/15/13	6/25/13
19	2.7	Obtain approval for final geometric schematic	15 days	10/9/13	10/29/13
20	3	Environmental Process	430 days	1/4/13	8/28/14
21	3.1	Provide planning and environmental linkages	100 days	1/4/13	5/23/13
22	3.2	Prepare draft environmental documentation	80 days	5/24/13	9/12/13
23	3.3	Conduct public meetings	3 days	1/23/13	1/25/13
24	3.4	Develop final environmental document	20 days	9/13/13	10/10/13
25	3.5	Obtain environmental clearance	60 days	10/11/13	1/2/14
26	3.6	Meet environmental commitments after clearance	120 days	1/31/14	7/17/14
27	3.7	Conduct environmental reevaluation	20 days	8/1/14	8/28/14
28	4	Design and PS&E Assembly	325 days	1/31/14	4/30/15
29	4.1	Conduct design meeting	5 days	1/31/14	2/6/14
30	4.2	Conduct design analyses	110 days	2/7/14	7/10/14

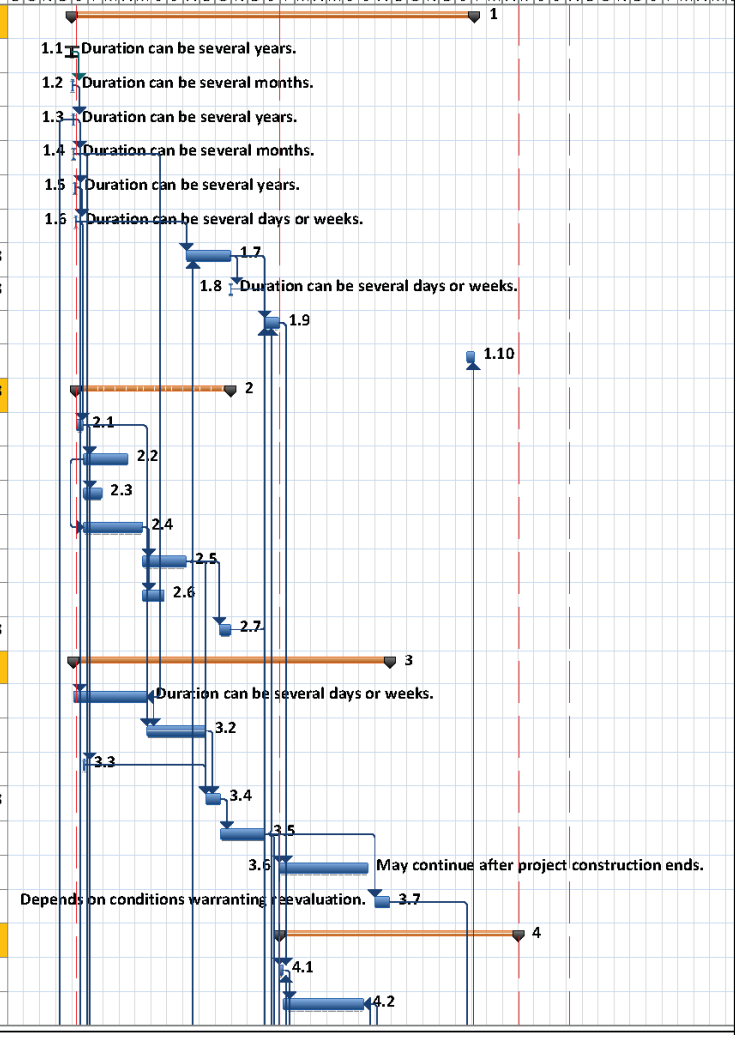

Figure 49. Work schedule tasks.

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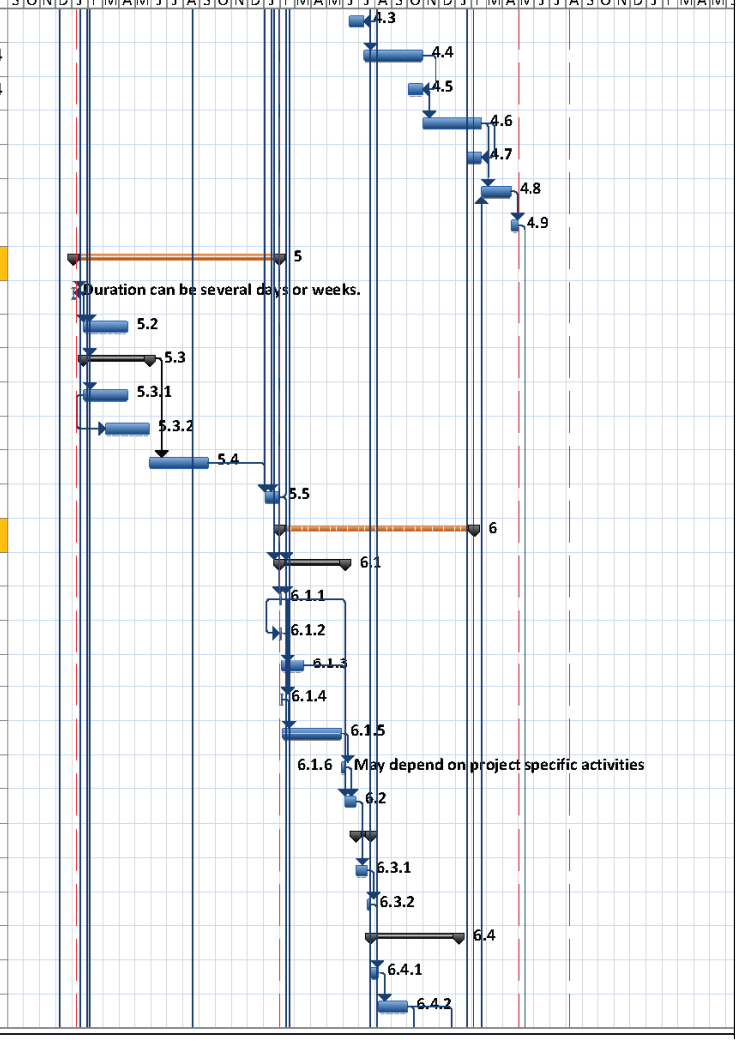
Transportation Project Development and Delivery Process - NCHRP 20-84 (Improved Right-of-Way Procedures and Business Practices)

ID	No.	Task Name	Working Days	Start Date	Finish Date
31	**4.3**	**Conduct 30% design meeting**	**20 days**	**6/13/14**	**7/10/14**
32	**4.4**	**Develop final horizontal and vertical alignments**	**80 days**	**7/11/14**	**10/30/14**
33	**4.5**	**Conduct 60% design meeting**	**20 days**	**10/3/14**	**10/30/14**
34	**4.6**	**Conduct detailed design**	**80 days**	**10/31/14**	**2/19/15**
35	**4.7**	**Conduct 90% design meeting**	**20 days**	**1/23/15**	**2/19/15**
36	**4.8**	**Prepare PS&E package**	**40 days**	**2/20/15**	**4/16/15**
37	**4.9**	**Conduct final design and initial construction coordination meetings**	**10 days**	**4/17/15**	**4/30/15**
38	**5**	**Acquisition - Planning and Preliminary Activities**	**280 days**	**1/4/13**	**1/30/14**
39	**5.1**	**Provide planning and real property acquisition linkages**	**1 day**	**1/4/13**	**1/4/13**
40	**5.2**	**Conduct real property research**	**60 days**	**1/23/13**	**4/16/13**
41	**5.3**	**Coordinate with other stakeholders**	**90 days**	**1/23/13**	**5/28/13**
42	5.3.1	Conduct early planning to anticipate displacements and associated problems	60 days	1/23/13	4/16/13
43	5.3.2	Provide for the resolution of problems to minimize adverse impacts	60 days	3/6/13	5/28/13
44	**5.4**	**Prepare right-of-way map and property descriptions**	**80 days**	**5/29/13**	**9/17/13**
45	**5.5**	**Obtain authorization to acquire property**	**20 days**	**1/3/14**	**1/30/14**
46	**6**	**Acquisition**	**265 days**	**1/31/14**	**2/5/15**
47	**6.1**	**Conduct appraisal or waiver valuation**	**89 days**	**1/31/14**	**6/4/14**
48	6.1.1	Determine if property has an anticipated low fair market value	2 days	1/31/14	2/3/14
49	6.1.2	Determine if property will be acquired by sale or donation	2 days	1/31/14	2/3/14
50	6.1.3	Prepare waiver valuation	30 days	2/4/14	3/17/14
51	6.1.4	Inspect property	2 days	2/4/14	2/5/14
52	6.1.5	Conduct appraisal	80 days	2/6/14	5/28/14
53	6.1.6	Develop approved appraisal of the fair market value of the property	5 days	5/29/14	6/4/14
54	**6.2**	**Establish just compensation**	**15 days**	**6/5/14**	**6/25/14**
55	**6.3**	**Prepare and make written offer**	**20 days**	**6/26/14**	**7/23/14**
56	6.3.1	Prepare written offer	15 days	6/26/14	7/16/14
57	6.3.2	Make written offer	5 days	7/17/14	7/23/14
58	**6.4**	**Acquire by negotiation**	**120 days**	**7/24/14**	**1/7/15**
59	6.4.1	Conduct negotiations	10 days	7/24/14	8/6/14
60	6.4.2	Donation or offer accepted or administrative settlement	40 days	8/7/14	10/1/14



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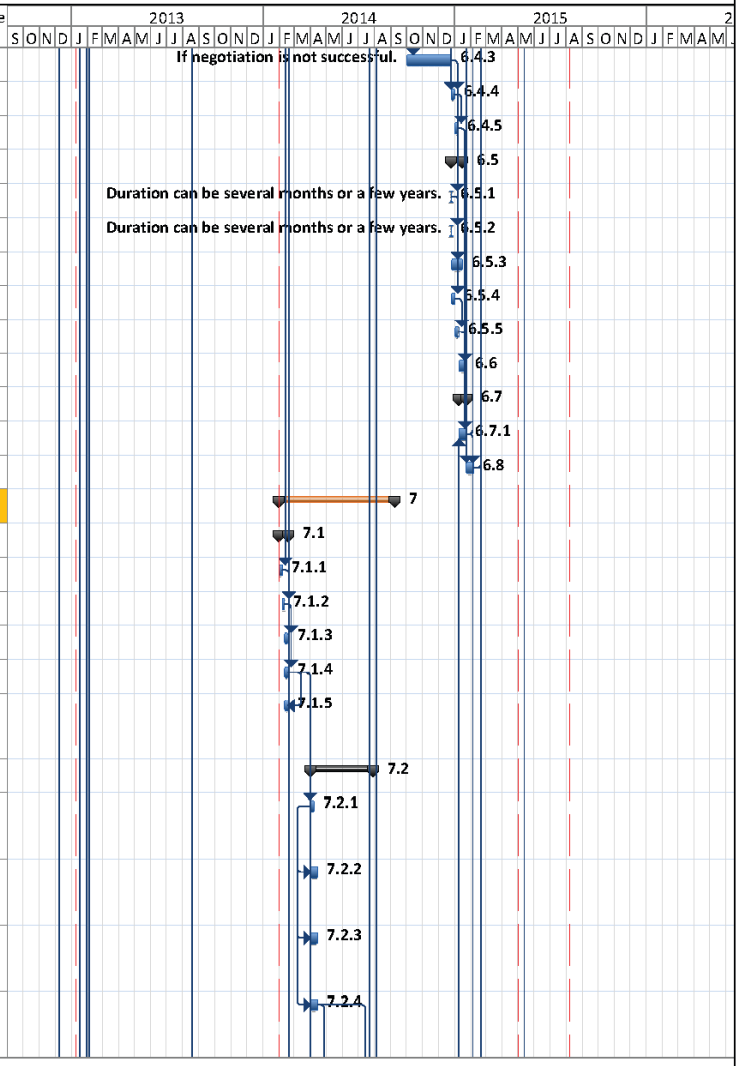
Transportation Project Development and Delivery Process - NCHRP 20-84 (Improved Right-of-Way Procedures and Business Practices)

ID	No.	Task Name	Working Days	Start Date	Finish Date
61	6.4.3	Alternate dispute resolution	60 days	10/2/14	12/24/14
62	6.4.4	Pay to owner agreed purchase price to acquire property	5 days	12/25/14	12/31/14
63	6.4.5	Reimburse owner for reasonable title transfer expenses	5 days	1/1/15	1/7/15
64	**6.5**	**Acquire by condemnation**	**16 days**	**12/25/14**	**1/15/15**
65	6.5.1	Conduct condemnation proceedings	1 day	12/25/14	12/25/14
66	6.5.2	Proceedings for claims against the U.S.	1 day	12/25/14	12/25/14
67	6.5.3	Pay reasonable attorney, appraisal, and engineering fees to owner	15 days	12/26/14	1/15/15
68	6.5.4	Deposit funds in court in accordance with 40 USC 3114(a) to (d)	5 days	12/26/14	1/1/15
69	6.5.5	Reimburse owner for reasonable title transfer expenses	5 days	1/2/15	1/8/15
70	**6.6**	**Demolish and dispose improvements**	**10 days**	**1/9/15**	**1/22/15**
71	**6.7**	**Post acquisition**	**10 days**	**1/9/15**	**1/22/15**
72	6.7.1	Require owner to surrender possession	10 days	1/9/15	1/22/15
73	**6.8**	**Prepare right-of-way certification**	**10 days**	**1/23/15**	**2/5/15**
74	**7**	**Relocation Assistance**	**157 days**	**1/31/14**	**9/8/14**
75	**7.1**	**Determine relocation assistance eligibility**	**12 days**	**1/31/14**	**2/17/14**
76	7.1.1	Provide written notice of intent to acquire property	5 days	1/31/14	2/6/14
77	7.1.2	Apply procedure to determine whether a person is a displaced person	2 days	2/7/14	2/10/14
78	7.1.3	Advisory services available at the discretion of the acquiring agency	5 days	2/11/14	2/17/14
79	7.1.4	Eligible for relocation assistance advisory services	5 days	2/11/14	2/17/14
80	7.1.5	Eligible for advisory assistance services to the extent established by the displacing agency	5 days	2/11/14	2/17/14
81	**7.2**	**Provide relocation assistance advisory (residential)**	**85 days**	**4/1/14**	**7/28/14**
82	7.2.1	Determine and make timely recommendations on needs and preferences of displaced persons for relocation assistance	5 days	4/1/14	4/7/14
83	7.2.2	Supply information about other federal and state programs and provide assistance for applying to those programs	10 days	4/1/14	4/14/14
84	7.2.3	Provide other services in order to minimize hardships to displaced persons in adjusting to relocation	10 days	4/1/14	4/14/14
85	7.2.4	Provide information on comparable replacement dwellings for homeowners and tenants	10 days	4/1/14	4/14/14



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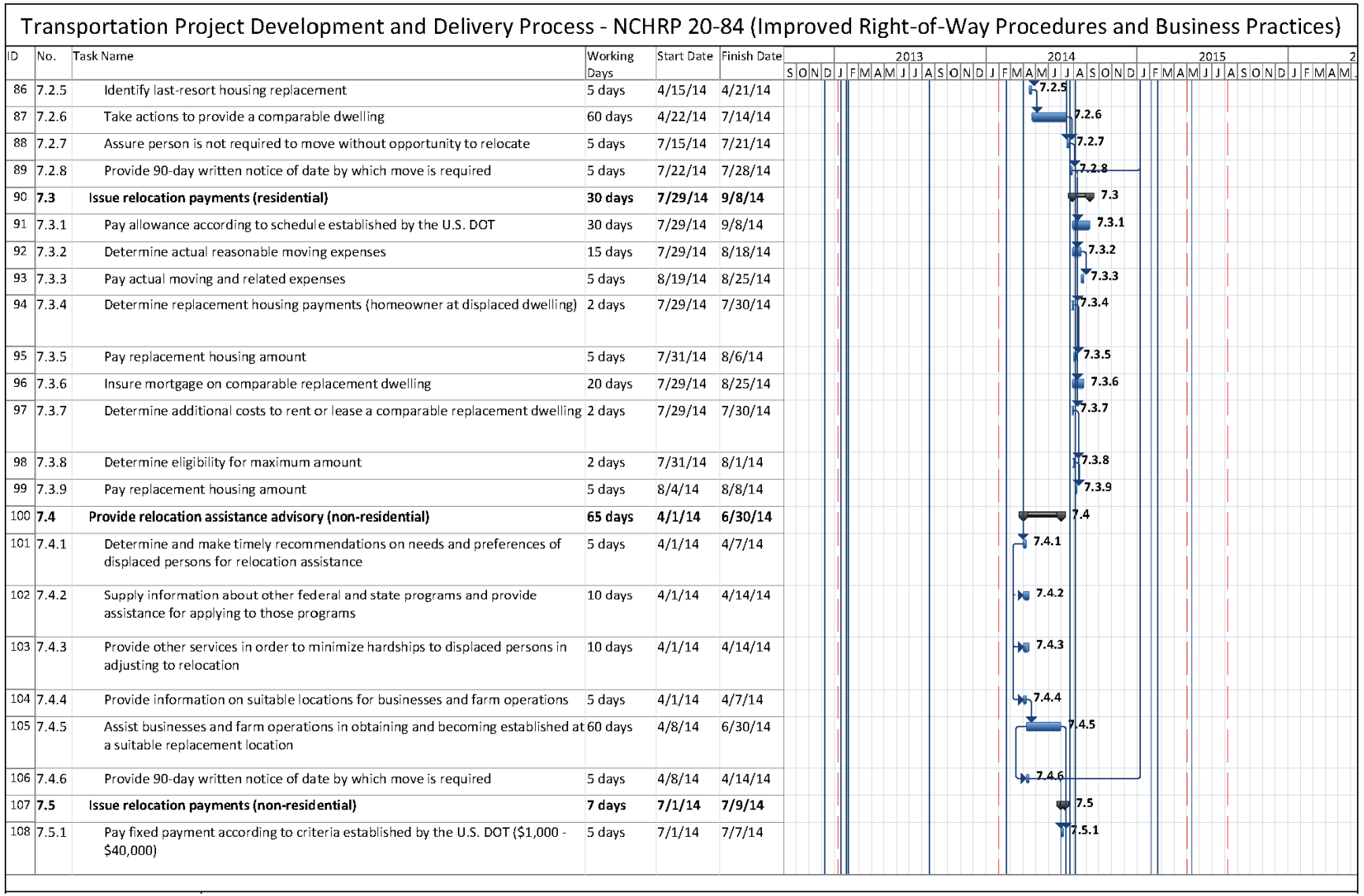

ID	No.	Task Name	Working Days	Start Date	Finish Date
86	7.2.5	Identify last-resort housing replacement	5 days	4/15/14	4/21/14
87	7.2.6	Take actions to provide a comparable dwelling	60 days	4/22/14	7/14/14
88	7.2.7	Assure person is not required to move without opportunity to relocate	5 days	7/15/14	7/21/14
89	7.2.8	Provide 90-day written notice of date by which move is required	5 days	7/22/14	7/28/14
90	**7.3**	**Issue relocation payments (residential)**	**30 days**	**7/29/14**	**9/8/14**
91	7.3.1	Pay allowance according to schedule established by the U.S. DOT	30 days	7/29/14	9/8/14
92	7.3.2	Determine actual reasonable moving expenses	15 days	7/29/14	8/18/14
93	7.3.3	Pay actual moving and related expenses	5 days	8/19/14	8/25/14
94	7.3.4	Determine replacement housing payments (homeowner at displaced dwelling)	2 days	7/29/14	7/30/14
95	7.3.5	Pay replacement housing amount	5 days	7/31/14	8/6/14
96	7.3.6	Insure mortgage on comparable replacement dwelling	20 days	7/29/14	8/25/14
97	7.3.7	Determine additional costs to rent or lease a comparable replacement dwelling	2 days	7/29/14	7/30/14
98	7.3.8	Determine eligibility for maximum amount	2 days	7/31/14	8/1/14
99	7.3.9	Pay replacement housing amount	5 days	8/4/14	8/8/14
100	**7.4**	**Provide relocation assistance advisory (non-residential)**	**65 days**	**4/1/14**	**6/30/14**
101	7.4.1	Determine and make timely recommendations on needs and preferences of displaced persons for relocation assistance	5 days	4/1/14	4/7/14
102	7.4.2	Supply information about other federal and state programs and provide assistance for applying to those programs	10 days	4/1/14	4/14/14
103	7.4.3	Provide other services in order to minimize hardships to displaced persons in adjusting to relocation	10 days	4/1/14	4/14/14
104	7.4.4	Provide information on suitable locations for businesses and farm operations	5 days	4/1/14	4/7/14
105	7.4.5	Assist businesses and farm operations in obtaining and becoming established at a suitable replacement location	60 days	4/8/14	6/30/14
106	7.4.6	Provide 90-day written notice of date by which move is required	5 days	4/8/14	4/14/14
107	**7.5**	**Issue relocation payments (non-residential)**	**7 days**	**7/1/14**	**7/9/14**
108	7.5.1	Pay fixed payment according to criteria established by the U.S. DOT ($1,000 - $40,000)	5 days	7/1/14	7/7/14

Figure 49. (Continued).

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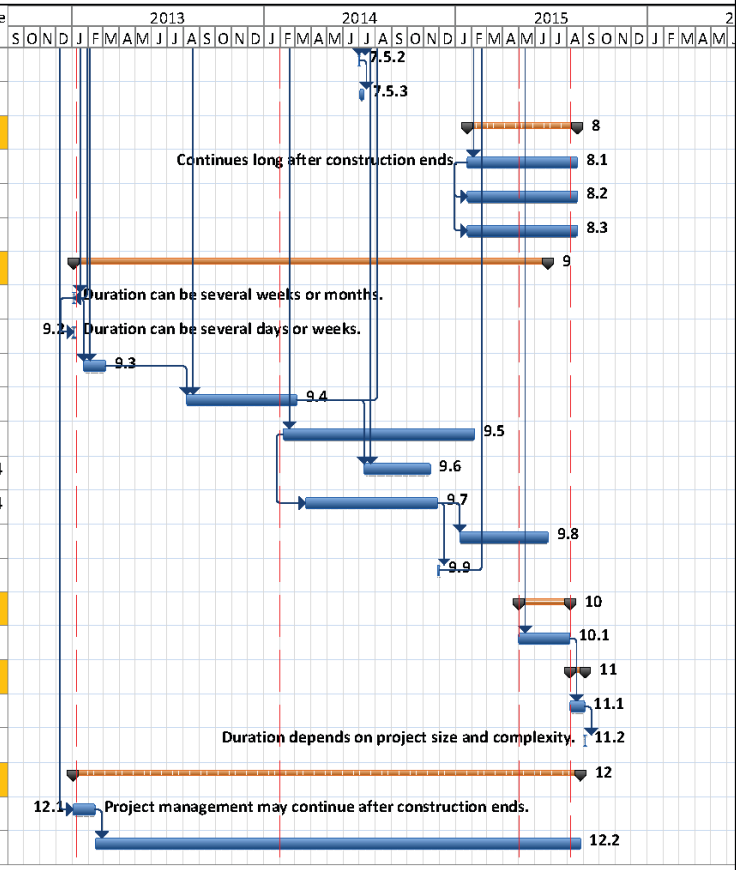
ID	No.	Task Name	Working Days	Start Date	Finish Date
109	7.5.2	Determine actual reasonable moving and related expenses	2 days	7/1/14	7/2/14
110	7.5.3	Pay actual moving and related expenses	5 days	7/3/14	7/9/14
111	**8**	**Property Management**	**150 days**	**1/23/15**	**8/20/15**
112	8.1	Inventory and manage property interests	150 days	1/23/15	8/20/15
113	8.2	Lease real property interests	150 days	1/23/15	8/20/15
114	8.3	Dispose property interests	150 days	1/23/15	8/20/15
115	**9**	**Utility Conflict Analysis, Permits, Relocation, and Reimbursement**	**645 days**	**1/4/13**	**6/25/15**
116	9.1	Provide planning and utility process linkages	1 day	1/4/13	1/4/13
117	9.2	Conduct coordination meetings	1 day	1/4/13	1/4/13
118	9.3	Conduct preliminary utility investigations	30 days	1/23/13	3/5/13
119	9.4	Survey visible utility appurtenances and assess impact	150 days	8/7/13	3/4/14
120	9.5	Coordinate utility relocation design with utility owners	260 days	2/7/14	2/5/15
121	9.6	Conduct detailed utility investigations	90 days	7/11/14	11/13/14
122	9.7	Prepare and execute utility agreements	180 days	3/21/14	11/27/14
123	9.8	Monitor utility relocations and reimburse utility owners	120 days	1/9/15	6/25/15
124	9.9	Prepare utility certification	2 days	11/28/14	12/1/14
125	**10**	**Letting**	**70 days**	**5/1/15**	**8/6/15**
126	10.1	Let project	70 days	5/1/15	8/6/15
127	**11**	**Construction**	**21 days**	**8/7/15**	**9/4/15**
128	11.1	Conduct pre-construction meeting	20 days	8/7/15	9/3/15
129	11.2	Build and deliver project	1 day	9/4/15	9/4/15
130	**12**	**Project Management**	**690 days**	**1/3/13**	**8/26/15**
131	12.1	Establish project management team	30 days	1/3/13	2/13/13
132	12.2	Manage project development and delivery process	660 days	2/14/13	8/26/15



October, 2013

Task	External Tasks	Manual Task	Finish-only		
Split	External Milestone	Duration-only	Deadline		
Milestone	Inactive Task	Manual Summary Rollup	Progress		
Summary	Inactive Milestone	Manual Summary			
Project Summary	Inactive Summary	Start-only			

Figure 49. (Continued).

Table 12. Work schedule attribute data.

Field	Description
ID	Row number (automatically generated)
No.	WBS coding scheme for each task, which could be a single digit (first-level task), two digits separated by a dot (second-level task), or three digits separated by dots (third-level task)
Task Name	Name of swim lane or activity in the Level 2 and Level 3 model
Working Days	Number of working days required to perform a task
Calendar Days	Number of calendar days required to perform a task, calculated as follows: $$int(DateDiff("n", [Start], [Finish])/(24 * 60) + 0.9)$$ where *n* is time interval (minutes); [*Start*] and [*Finish*] are the starting and ending task dates, respectively; and 0.9 is used to round up the result to the next integer day
Start Date	Task start date, calculated automatically based on predecessor and successor conditions, except for Task 1.1 (Develop long-range transportation plans), which initiates the work schedule
Finish Date	Task end date, calculated automatically based on the duration and the start date of a task
Predecessors	Preceding tasks and the type of relationship with those tasks, which could be start-to-start (SS), start-to-finish (SF), finish-to-start (FS), or finish-to-finish (FF)
Successors	Subsequent tasks and type of relationship with those tasks
Comment	Comment
Critical	Critical path indicator

(*continued from page 74*)

before and after the authorization to acquire real property: Task 5 (Acquisition—Planning and Preliminary Activities) and Task 6 (Acquisition). The reason for splitting the acquisition task is that the Uniform Act handles real property acquisition from the beginning of valuation planning, which normally takes place after receiving authorization to acquire real property. State DOTs typically depict their real property acquisition process this way. All first-level tasks are shown on a shaded background and in bold letters.

- **Second-level tasks.** Each task at this level represents an individual activity within a Level 2 model swim lane. For example, Task 7.1 (Determine relocation assistance eligibility) is the first activity that takes place within the Task 7 (Relocation Assistance) swim lane. All second-level tasks are shown in bold letters with a white background.
- **Third-level tasks.** Each task at this level represents one or more Level 3 model activities (depending on the case). For example, Task 7.1.1 (Provide written notice of intent to acquire property) in the work schedule corresponds to one activity within the Relocation Assistance Eligibility Determination swim lane in the Level 3 model. In this case, the correspondence between work schedule task and Level 3 model activity is one-to-one. In several cases, a work schedule task corresponds to a group of Level 3 model activities. For example, Task 6.1.4 (Inspect property) covers two Level 3 model activities: Invite the owner to accompany the appraiser during the inspection and conduct the inspection of the property. All third-level tasks are shown in regular text with a white background.

The Working Days field represents the number of working days required to perform a task. For tasks without any subtasks (i.e., child tasks), the task duration is based on information gathered from the literature review and feedback provided by stakeholders during the peer exchange or interviews. For tasks with one or more subtasks (i.e., parent tasks), the duration is automatically calculated. The work schedule described in this chapter is a reference work schedule, and every effort was made to populate the work schedule with typical durations; however, some arbitrary durations were included (mainly for visualization purposes). In general, the work schedule includes the following types of task durations:

- **Typical duration.** This type of duration represents a typical time required to complete a project task (although there could be significant variations from project to project).
- **One-day duration.** Some tasks, such as Task 1.1 (Develop long-range transportation plans), can last for many months or years. For simplicity, the research team set the duration of these tasks at 1 day. However, users can easily change the values in the project schedule file as needed to depict longer, more realistic durations for the following tasks:
  - Task 1.1 (Develop long-range transportation plans).
  - Task 1.2 (Identify project need and purpose).
  - Task 1.3 (Identify project requirements and conduct studies).
  - Task 1.4 (Prepare cost estimate and identify funding sources).
  - Task 1.5 (Develop/update intermediate and short-range programs).

  - Task 1.6 (Authorize project development).
  - Task 1.8 (Update project requirements, cost estimate, and schedule).
  - Task 3.1 (Provide planning and environmental linkages).
  - Task 3.6 (Meet environmental commitments after clearance).
  - Task 5.1 (Provide planning and real property acquisition linkages).
  - Task 6.5.1 (Conduct condemnation proceedings).
  - Task 6.5.2 (Proceedings for claims against the United States).
  - Task 8.1 (Inventory and manage property interests).
  - Task 9.1 (Provide planning and utility process linkages).
  - Task 9.2 (Conduct coordination meetings).
  - Task 11.2 (Build and deliver project).
  - Task 12.2 (Manage project development and delivery process).
- **Per-acquisition unit duration.** This type of duration represents a typical time required to complete an acquisition activity on a per-unit acquisition basis. These durations are assigned to most real property acquisition tasks (i.e., Task 6). In practice, the total duration of real property acquisition tasks is a function of the number of real property interests to be acquired and the resources assigned to complete the task. Because the work schedule described in this chapter is a reference work schedule, a decision was made to depict real property acquisition tasks on a per-unit acquisition basis. For example, according to Task 6.1.5, it takes 80 working days to conduct one appraisal. For a project that involves acquiring 100 parcels, it would be necessary to factor in all the resources needed to appraise the 100 parcels within the time constraints of the project and then assign the corresponding value to Task 6.1.5. Alternatively, users could use the scheduling software tool to manage production units and resources.
- **Per-relocation unit duration.** This type of duration represents a typical time required to complete a relocation assistance activity on a per-unit relocation basis (i.e., following a similar approach as that followed for the real property acquisition tasks). These durations are assigned to relocation assistance tasks (e.g., Task 7). For example, according to Task 7.2.6, a relocation agent needs 60 working days to take all the actions needed to provide a comparable dwelling to a displaced person. For a project that involves 100 relocations, it would be necessary to factor in all the resources needed to accomplish this task within the time constraints of the project and then assign the corresponding value to Task 7.2.6. Alternatively, users could use the scheduling software tool to manage production units and resources.

Application Examples

The reference work schedule could be used for a variety of applications. This section illustrates three basic examples: appraisal duration analysis, impact of condemnation, and use of baselines. The first example shows the effect of extending the preparation of an appraisal (Task 6.1.5) on the real property acquisition process and describes how to determine the critical duration of this activity. The second example illustrates the effect of condemnation proceedings (Task 6.5.1) on the acquisition process. The third example shows the process to set baselines and describes their use to help monitor the progress of a project.

Other applications include, but are not limited to, assigning resources to tasks, managing project budgets, analyzing workloads, facilitating coordination with internal and external stakeholders, adjusting schedules, monitoring project progress, and preparing reports. Agencies could also use the work schedule to train internal and external stakeholders on concepts such as project development and delivery process interdependencies and Uniform Act requirements.

Example 1: Appraisal Duration Analysis

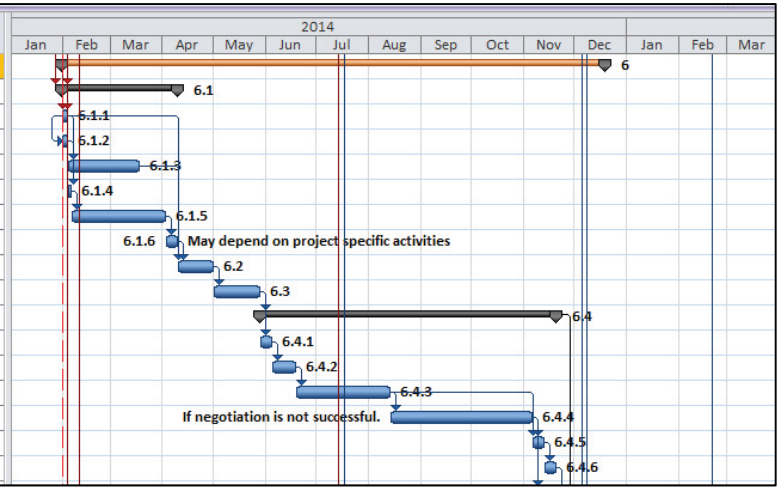
This example examines the effects of modifying the time it takes to prepare an appraisal on the duration of the real property acquisition process. According to Figure 49, the typical duration for conducting an appraisal (Task 6.1.5) is 80 working days and the total duration of the real property acquisition task (Task 6) is 265 days. Task 6.1.5 is not on the critical path. If the duration of the appraisal could be shortened to, say, 40 working days, the duration of Task 6 could potentially decrease to 230 days (Figure 50[a]). Less clear is the benefit to the entire project, because other tasks are on the critical path. If the duration of the appraisal increases to 90 days, however, the duration of Task 6 would increase to 280 days (Figure 50[b]). Under this scenario, the appraisal task is now part of the critical path, along with several other real property acquisition subtasks. (Note: the critical appraisal duration for this example is 86 days.) This information could be used to determine what resources are necessary to prevent the appraisal activity from affecting not just the real property acquisition but also the delivery of the entire transportation project.

Example 2: Impact of Condemnation

This example evaluates the impact of condemnation proceedings on the duration of the real property acquisition process and the project delivery date. For simplicity, assume that condemnation proceedings (Task 6.5.1) last 40 working days (i.e., 56 calendar days). For this hypothetical example, Figure 51(a) shows that the total duration of the real property

(a) Duration of appraisal: 40 days.

	No.	Task Name	Working Days	Start Date	Finish Date	Critical
46	**6**	**Acquisition**	**230 days**	**1/31/14**	**12/18/14**	**No**
47	**6.1**	**Conduct appraisal or waiver valuation**	**49 days**	**1/31/14**	**4/9/14**	**No**
48	6.1.1	Determine if property has an anticipated low fair market value	2 days	1/31/14	2/3/14	No
49	6.1.2	Determine if property will be acquired by sale or donation	2 days	1/31/14	2/3/14	No
50	6.1.3	Prepare waiver valuation	30 days	2/4/14	3/17/14	No
51	6.1.4	Inspect property	2 days	2/4/14	2/5/14	No
52	6.1.5	Conduct appraisal	40 days	2/6/14	4/2/14	No
53	6.1.6	Develop approved appraisal of the fair market value of the property	5 days	4/3/14	4/9/14	No
54	**6.2**	**Establish just compensation**	**15 days**	**4/10/14**	**4/30/14**	**No**
55	**6.3**	**Prepare and make written offer**	**20 days**	**5/1/14**	**5/28/14**	**No**
56	**6.4**	**Acquire by negotiation**	**125 days**	**5/29/14**	**11/19/14**	**No**
57	6.4.1	Make written offer	5 days	5/29/14	6/4/14	No
58	6.4.2	Conduct negotiations	10 days	6/5/14	6/18/14	No
59	6.4.3	Donation or offer accepted or administrative settlement	40 days	6/19/14	8/13/14	No
60	6.4.4	Alternate dispute resolution	60 days	8/14/14	11/5/14	No
61	6.4.5	Pay to owner agreed purchase price to acquire property	5 days	11/6/14	11/12/14	No
62	6.4.6	Reimburse owner for reasonable title transfer expenses	5 days	11/13/14	11/19/14	No



(b) Duration of appraisal: 90 days.

	No.	Task Name	Working Days	Start Date	Finish Date	Critical
46	**6**	**Acquisition**	**280 days**	**1/31/14**	**2/26/15**	**Yes**
47	**6.1**	**Conduct appraisal or waiver valuation**	**99 days**	**1/31/14**	**6/18/14**	**Yes**
48	6.1.1	Determine if property has an anticipated low fair market value	2 days	1/31/14	2/3/14	Yes
49	6.1.2	Determine if property will be acquired by sale or donation	2 days	1/31/14	2/3/14	No
50	6.1.3	Prepare waiver valuation	30 days	2/4/14	3/17/14	No
51	6.1.4	Inspect property	2 days	2/4/14	2/5/14	Yes
52	6.1.5	Conduct appraisal	90 days	2/6/14	6/11/14	Yes
53	6.1.6	Develop approved appraisal of the fair market value of the property	5 days	6/12/14	6/18/14	Yes
54	**6.2**	**Establish just compensation**	**15 days**	**6/19/14**	**7/9/14**	**Yes**
55	**6.3**	**Prepare and make written offer**	**20 days**	**7/10/14**	**8/6/14**	**Yes**
56	**6.4**	**Acquire by negotiation**	**125 days**	**8/7/14**	**1/28/15**	**Yes**
57	6.4.1	Make written offer	5 days	8/7/14	8/13/14	Yes
58	6.4.2	Conduct negotiations	10 days	8/14/14	8/27/14	Yes
59	6.4.3	Donation or offer accepted or administrative settlement	40 days	8/28/14	10/22/14	Yes
60	6.4.4	Alternate dispute resolution	60 days	10/23/14	1/14/15	Yes
61	6.4.5	Pay to owner agreed purchase price to acquire property	5 days	1/15/15	1/21/15	No
62	6.4.6	Reimburse owner for reasonable title transfer expenses	5 days	1/22/15	1/28/15	No

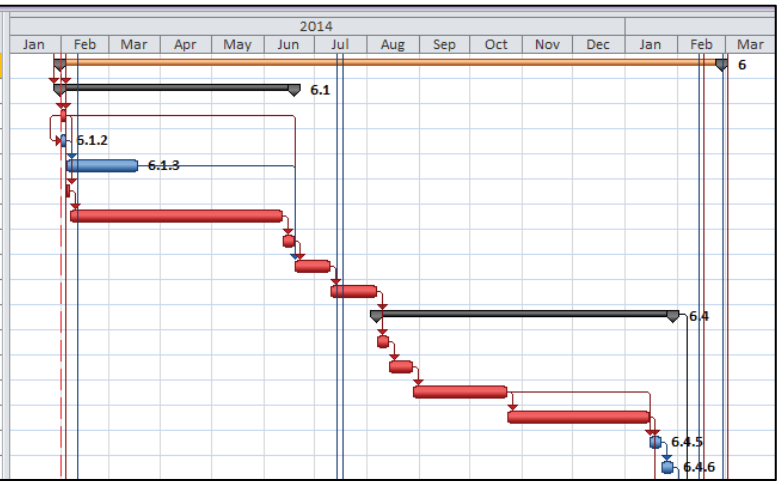
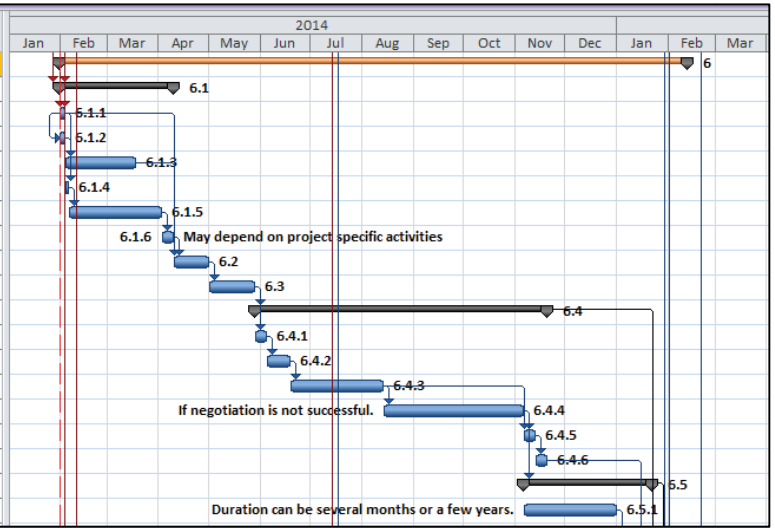


Figure 50. Appraisal duration analysis.

(a) Duration of condemnation proceedings: 40 days.

	No.	Task Name	Working Days	Start Date	Finish Date	Critical
46	**6**	**Acquisition**	**269 days**	**1/31/14**	**2/11/15**	**No**
47	**6.1**	**Conduct appraisal or waiver valuation**	**49 days**	**1/31/14**	**4/9/14**	**No**
48	6.1.1	Determine if property has an anticipated low fair market value	2 days	1/31/14	2/3/14	No
49	6.1.2	Determine if property will be acquired by sale or donation	2 days	1/31/14	2/3/14	No
50	6.1.3	Prepare waiver valuation	30 days	2/4/14	3/17/14	No
51	6.1.4	Inspect property	2 days	2/4/14	2/5/14	No
52	6.1.5	Conduct appraisal	40 days	2/6/14	4/2/14	No
53	6.1.6	Develop approved appraisal of the fair market value of the property	5 days	4/3/14	4/9/14	No
54	**6.2**	**Establish just compensation**	**15 days**	**4/10/14**	**4/30/14**	**No**
55	**6.3**	**Prepare and make written offer**	**20 days**	**5/1/14**	**5/28/14**	**No**
56	**6.4**	**Acquire by negotiation**	**125 days**	**5/29/14**	**11/19/14**	**No**
57	6.4.1	Make written offer	5 days	5/29/14	6/4/14	No
58	6.4.2	Conduct negotiations	10 days	6/5/14	6/18/14	No
59	6.4.3	Donation or offer accepted or administrative settlement	40 days	6/19/14	8/13/14	No
60	6.4.4	Alternate dispute resolution	60 days	8/14/14	11/5/14	No
61	6.4.5	Pay to owner agreed purchase price to acquire property	5 days	11/6/14	11/12/14	No
62	6.4.6	Reimburse owner for reasonable title transfer expenses	5 days	11/13/14	11/19/14	No
63	**6.5**	**Acquire by condemnation**	**55 days**	**11/6/14**	**1/21/15**	**No**
64	6.5.1	Conduct condemnation proceedings	40 days	11/6/14	12/31/14	No



(b) Duration of condemnation proceedings: 50 days.

	No.	Task Name	Working Days	Start Date	Finish Date	Critical
46	**6**	**Acquisition**	**279 days**	**1/31/14**	**2/25/15**	**Yes**
47	**6.1**	**Conduct appraisal or waiver valuation**	**49 days**	**1/31/14**	**4/9/14**	**Yes**
48	6.1.1	Determine if property has an anticipated low fair market value	2 days	1/31/14	2/3/14	Yes
49	6.1.2	Determine if property will be acquired by sale or donation	2 days	1/31/14	2/3/14	No
50	6.1.3	Prepare waiver valuation	30 days	2/4/14	3/17/14	No
51	6.1.4	Inspect property	2 days	2/4/14	2/5/14	Yes
52	6.1.5	Conduct appraisal	40 days	2/6/14	4/2/14	Yes
53	6.1.6	Develop approved appraisal of the fair market value of the property	5 days	4/3/14	4/9/14	Yes
54	**6.2**	**Establish just compensation**	**15 days**	**4/10/14**	**4/30/14**	**Yes**
55	**6.3**	**Prepare and make written offer**	**20 days**	**5/1/14**	**5/28/14**	**Yes**
56	**6.4**	**Acquire by negotiation**	**125 days**	**5/29/14**	**11/19/14**	**Yes**
57	6.4.1	Make written offer	5 days	5/29/14	6/4/14	Yes
58	6.4.2	Conduct negotiations	10 days	6/5/14	6/18/14	Yes
59	6.4.3	Donation or offer accepted or administrative settlement	40 days	6/19/14	8/13/14	Yes
60	6.4.4	Alternate dispute resolution	60 days	8/14/14	11/5/14	Yes
61	6.4.5	Pay to owner agreed purchase price to acquire property	5 days	11/6/14	11/12/14	No
62	6.4.6	Reimburse owner for reasonable title transfer expenses	5 days	11/13/14	11/19/14	No
63	**6.5**	**Acquire by condemnation**	**65 days**	**11/6/14**	**2/4/15**	**Yes**
64	6.5.1	Conduct condemnation proceedings	50 days	11/6/14	1/14/15	Yes

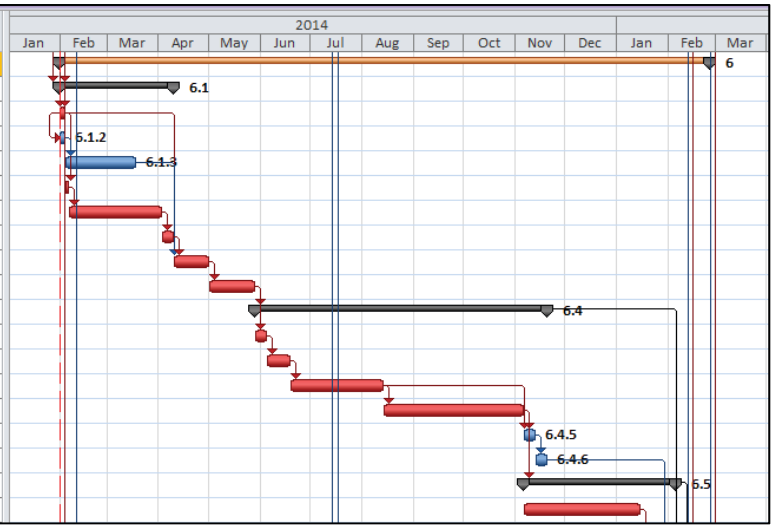


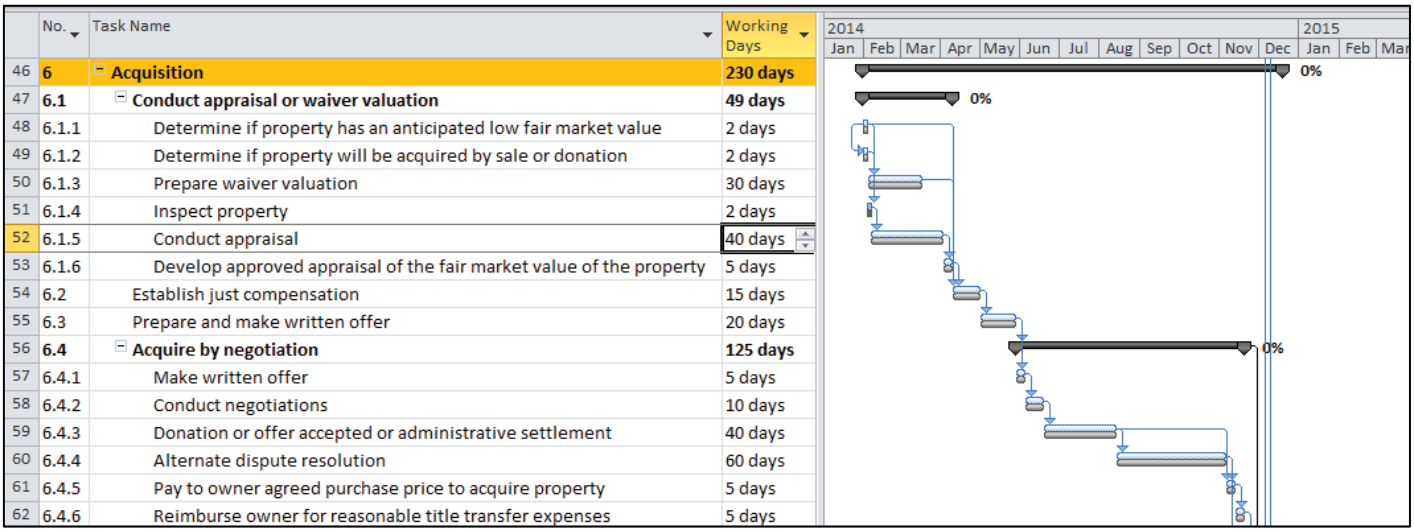
Figure 51. Impact of condemnation on real property acquisition tasks.

acquisition task (Task 6) is 269 days. The task is not on the critical path. Increasing the duration to 50 working days (i.e., 70 calendar days) would increase the total duration of Task 6 to 279 days, making the condemnation proceedings part of the critical path (Figure 51[b]). Increasing the duration of the condemnation proceedings further would have a corresponding effect both on the duration of the acquisition of real property and the duration of the whole project. For example, if the condemnation proceedings last 261 working days (i.e., 1 calendar year), the duration of the real property acquisition would increase to 490 working days (i.e., 686 calendar days, or almost 23 months), and the project could be delayed by 211 additional working days (i.e., 295 calendar days, or almost 10 months).

Example 3: Use of Baselines

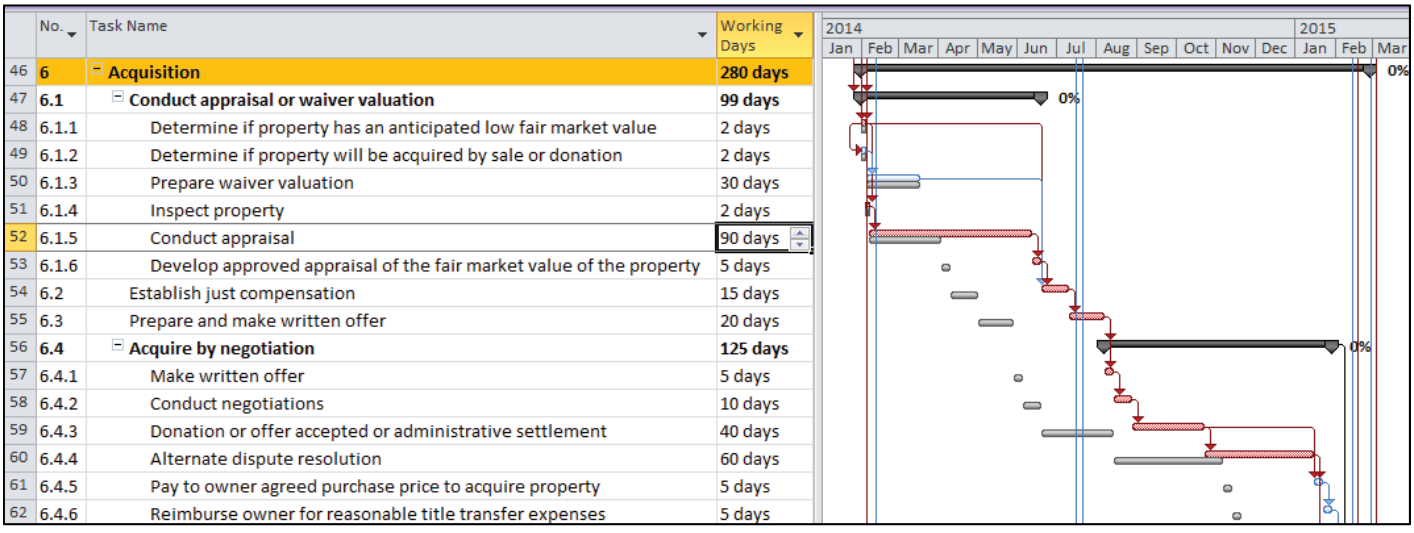
This example demonstrates the use of baselines for monitoring the progress of a project. Baselines are snapshots of the work schedule that reflect a specific set of assumptions regarding tasks, resources, and assignments. As such, they are particularly useful to help visualize the impact of changes to the work schedule. As an illustration, Figure 52(a) shows the construction of a baseline that represents the original conditions shown in Figure 49 (i.e., assuming the duration of the appraisal to be 40 days). Figure 52(b) shows the baseline and a modified schedule that results from delaying the completion of the appraisal by 50 days, making Task 6.1.5

(a) Baseline work schedule associated with the original work schedule.



	No.	Task Name	Working Days
46	**6**	**Acquisition**	**230 days**
47	**6.1**	**Conduct appraisal or waiver valuation**	**49 days**
48	6.1.1	Determine if property has an anticipated low fair market value	2 days
49	6.1.2	Determine if property will be acquired by sale or donation	2 days
50	6.1.3	Prepare waiver valuation	30 days
51	6.1.4	Inspect property	2 days
52	6.1.5	Conduct appraisal	40 days
53	6.1.6	Develop approved appraisal of the fair market value of the property	5 days
54	6.2	Establish just compensation	15 days
55	6.3	Prepare and make written offer	20 days
56	**6.4**	**Acquire by negotiation**	**125 days**
57	6.4.1	Make written offer	5 days
58	6.4.2	Conduct negotiations	10 days
59	6.4.3	Donation or offer accepted or administrative settlement	40 days
60	6.4.4	Alternate dispute resolution	60 days
61	6.4.5	Pay to owner agreed purchase price to acquire property	5 days
62	6.4.6	Reimburse owner for reasonable title transfer expenses	5 days

(b) Baseline work schedule versus work schedule after delays in conducting appraisal.



	No.	Task Name	Working Days
46	**6**	**Acquisition**	**280 days**
47	**6.1**	**Conduct appraisal or waiver valuation**	**99 days**
48	6.1.1	Determine if property has an anticipated low fair market value	2 days
49	6.1.2	Determine if property will be acquired by sale or donation	2 days
50	6.1.3	Prepare waiver valuation	30 days
51	6.1.4	Inspect property	2 days
52	6.1.5	Conduct appraisal	90 days
53	6.1.6	Develop approved appraisal of the fair market value of the property	5 days
54	6.2	Establish just compensation	15 days
55	6.3	Prepare and make written offer	20 days
56	**6.4**	**Acquire by negotiation**	**125 days**
57	6.4.1	Make written offer	5 days
58	6.4.2	Conduct negotiations	10 days
59	6.4.3	Donation or offer accepted or administrative settlement	40 days
60	6.4.4	Alternate dispute resolution	60 days
61	6.4.5	Pay to owner agreed purchase price to acquire property	5 days
62	6.4.6	Reimburse owner for reasonable title transfer expenses	5 days

Figure 52. Use of baselines before and after changes to the work schedule.

(conduct appraisal) part of the critical path. Additional baselines could be generated to illustrate the impact of subsequent delays or to monitor the project through several schedule modifications.

Summary

This chapter described a reference work schedule that incorporates the requirements and procedures in the Uniform Act into the reference (or typical) transportation project and delivery process. The purpose of the work schedule is to provide a graphical representation of real property acquisition and relocation assistance scheduling activities within the context of both the Uniform Act and the typical requirements of a transportation project.

To provide context, this chapter also included a discussion of typical project durations, including both the entire project development and delivery process and real property acquisition and relocation assistance activities. Every project is different, making the determination of the duration of a single typical project difficult. For example, according to a GAO report (*46*), it can take 9–19 years to plan, gain approval for, design, and build a new, major federal-aid highway project that has significant environmental impacts. Similarly, according to an AASHTO report (*47*), a major transportation project can take 10 years to 15 years from beginning to end, even without controversial issues that can slow the project further.

This chapter provided a few examples of state DOT efforts to derive metrics to determine the duration and impact of their real property acquisition process. For example, the Florida DOT estimates the length of time between appraisals and the right-of-way certification to be 18–24 months. Similarly, the Minnesota DOT programs real property acquisitions using an 18-month schedule from the time the right-of-way map has been received until a project goes to letting. Using simple static Gantt charts to document and schedule real property activities is quite common. Less common is the use of scheduling software tools to conduct what-if scenarios to understand and anticipate the impact of activity changes within the overall schedule and the critical path of the real property process. Examples of state DOTs that use scheduling software for this purpose include the North Carolina DOT and the Ohio DOT.

Other state DOTs are using statistical methods to derive central tendency and dispersion estimators of right-of-way activity durations. For example, based on data from 45 completed projects that had at least 10 parcels per project, the Texas DOT concluded that the mean time to move from right-of-way release to possession of the property was 18 months, while the mean time to move from the initial appraisal to possession of the property was 11 months. However, there was significant dispersion in the data. From right-of-way release to possession of the property, the standard deviation and range were 16 months and 69 months, respectively. From the initial appraisal to possession of the property, the standard deviation and range were 13 months and 59 months, respectively. For critical path parcels, the numbers were more dramatic. In this case, the mean time to move from right-of-way release to possession of the property was 33 months, while the mean time to move from the initial appraisal to possession of the property was 24 months. The dispersion around the mean for this subsample was also quite significant.

The research team developed the reference work schedule in both Microsoft Project 2010 format and PDF, and both files are provided as standalone files on CRP-CD 154. The work schedule includes tasks that represent Level 2 model swim lanes and activities as well as Level 3 model activities. The WBS is organized into three levels to account for tasks that represent a swim lane (first-level tasks), an individual activity within a swim lane (second-level tasks), or an activity required by the Uniform Act (third-level tasks).

The reference work schedule could be used for a variety of applications. This chapter described three basic examples: appraisal duration analysis, impact of condemnation, and use of baselines. The first example shows the effect of extending the preparation of an appraisal (Task 6.1.5) on the real property acquisition process and describes how to determine the critical duration of this activity. The second example illustrates the effect of condemnation proceedings (Task 6.5.1) on the acquisition process. The third example shows the process to set baselines and describes their use to help monitor the progress of a project. Other applications include, but are not limited to, assigning resources to tasks, managing project budgets, analyzing workloads, facilitating coordination with internal and external stakeholders, adjusting schedules, monitoring project progress, and preparing reports. Agencies could also use the work schedule to train internal and external stakeholders on concepts such as project development and delivery process interdependencies and Uniform Act requirements.

CHAPTER 5

Issues, Challenges, and Strategies for Improvement or Optimization

Introduction

A critical component of the research was to conduct an analysis of key elements of the state project development and delivery process to identify opportunities for a more effective integration of real property-related activities with the rest of the process. The analysis included an evaluation of issues and challenges affecting all project development and delivery process activities with a real property component as well as the identification of strategies for improvement or optimization to address those issues and challenges.

Part of the analysis was to determine the need and justification for process activities, whether the extent of these activities should be modified, and whether their timing or position in the overall process should be modified to ensure an optimized process (including eliminating redundant activities and/or processes and converting sequential activity sequences to concurrent activity sequences). As described in Chapters 3 and 4 and Appendix C, this analysis resulted in a series of process diagrams (the Level 1, Level 2, and Level 3 diagrams) and activity descriptions, as well as a reference work schedule depicting the acquisition of real property and relocation advisory services.

This chapter summarizes issues and challenges that affect project development and delivery process activities that typically have a real property component and identifies strategies for process improvement or optimization to address those issues and challenges. For many activities, the list of issues, challenges, and strategies was based on the responses provided by stakeholders during the surveys and interviews conducted during the first phase of the research. In other cases, the source was information gathered through additional interviews with stakeholders, feedback obtained during the peer exchange, as well as issues, best practices, and lessons learned from previous studies or experience.

Many project development and delivery process activities could have real property elements. To ensure the analysis was manageable, the research team focused only on process activities with a significant real property component (see Figure 11 in Chapter 3, and Appendix C). Activities with a relatively minor real property impact were not evaluated or emphasized.

Definition, Selection, Financing, and Scheduling

Prepare Cost Estimate and Identify Funding Sources

Issues and challenges include:

- Not involving right-of-way personnel in planning and programming, or underestimating the importance of involving right-of-way staff in planning and project scoping. Such involvement is particularly critical when the need to involve right-of-way personnel may not be readily apparent to project managers (e.g., for meeting federal and state accessibility requirements, identifying real property requirements and challenges to support environmental commitments, and identifying difficult locations from a real property acquisition perspective).
- Inadequate planning-level cost estimates for real property acquisition.
- Project funding uncertainty (e.g., if the funding source is not identified; the funding source is identified but is not adequate to meet the project scope; a combination of funding sources is identified but one or more sources are uncertain; or there are changes in funding levels).
- Matching funds uncertainty (e.g., a source is not yet identified or local and state matching funds are inadequate).
- Scaling the project scope to match the available funding versus the project need.
- Not clearly defining the project purpose and need.

Strategies for improvement or optimization include:

- Ensure that right-of-way personnel are consistently engaged as part of the team performing project scoping and cost

estimating. Legal personnel experienced in real estate should also be involved, especially if large or complex real property acquisitions are expected.
- Seek executive-level commitment about early engagement of right-of-way staff in the project development process and be willing to raise concerns proactively to executive management if this early engagement is not occurring on projects.
- Have right-of-way personnel perform impact analysis for the proposed project to assess the size and complexity of real property activities, and ensure the initial planning-level project schedule includes the findings of the real property assessment.
- Develop statewide guidelines for planning-level cost estimates that include requiring that any estimate of real property cost is prepared by right-of-way personnel. The guidelines for the real property estimate should include contingency levels that decrease as the project team gains a greater understanding of the real property impacts on a project (e.g., 20 percent for the initial planning-level estimate, 10 percent for estimates prepared after completing the preliminary design, and so on). The guidelines should include the use of real property cost escalation factors for projects in fast-growing areas or where starting a project is likely to affect land values significantly prior to the actual acquisition of property for the transportation project. The guidelines also should include protocols or procedures to monitor the quality of the planning-level real property cost estimates against both the estimate prepared at the start of the real property acquisition phase and the actual acquisition cost for a project. *NCHRP Report 625* provides additional guidance for developing real property cost estimates throughout the project development process (*53*).
- Coordinate with agency environmental personnel to understand mitigation requirements that might result in the need to acquire additional real property and then ensure that this cost is properly reflected in the estimate.
- Engage external stakeholders, including the FHWA division realty specialist, before developing the initial real property cost estimate in situations that involve potentially large or complex real property acquisitions. This is particularly critical in situations that involve federal land transfers or tribal lands. Part of the responsibilities of state DOT right-of-way personnel is to develop relationships with the appropriate representatives of the various federal agencies or tribes.
- Have state DOT right-of-way personnel prepare (or at least review) planning-level cost estimates and real property impact assessments for LPA real property acquisitions, particularly if state DOT personnel have more experience in real property acquisition activities than LPA staff.
- Use standardized forms that include real property components to develop transportation project scopes that facilitate the development of preliminary cost estimates and schedules. The real property components should include both real property acquisition and an assessment of potential relocation assistance impacts and requirements. NCHRP Project 08-88 is conducting an assessment of scoping practices around the country, including a review of forms used by different state DOTs, and will develop a suggested framework for developing project scopes.

Beyond the preparation of project-level, preliminary-level scopes, cost estimates, and schedules, state DOTs could pursue strategies to facilitate corridor preservation and the identification of future real property needs and requirements. Corridor preservation techniques help to avoid or minimize the impacts of transportation projects that involve widening existing alignments or developing new alignments (*54, 55*). Examples of corridor preservation strategies include:

- Formalize protocols that enable the official registration of transportation plans with land title registration offices. These protocols would enable those offices to add notes or caveats to title certificates on the future use of a corridor.
- Introduce mechanisms for transportation agencies to acquire real property or provide compensation during the planning phase (e.g., through taxing districts to fund advance real property acquisition programs). This strategy would enable communities to preserve corridors for future transportation use or in hardship situations (e.g., if a property owner cannot sell a property because of a caveat on the property title certificate on the future use of a corridor).
- Establish mechanisms that facilitate effective information exchanges among all stakeholders involved in the corridor preservation effort, including transportation agencies, planning agencies, property owners, appraisal districts, local and county governments, and the public. One such mechanism involves the use of GIS-based proposed acquisition overlays (published on easily accessible websites) that show proposed corridors in relation to landmarks and existing parcels and enable stakeholders to provide comments.
- Establish protocols that enable transportation agencies to provide input on building setbacks on corridors designated for future road expansion. One mechanism to achieve this objective is to enable transportation agencies to review and comment on building permit applications submitted to and managed by local jurisdictions.

Secure Federal, State, and Local Agreements

Issues and challenges include:

- Project funding uncertainty (e.g., if the funding source is not identified; the funding source is identified but inadequate to

meet the project scope; several funding sources, including local and state matching funds, are identified but one or more sources are uncertain; or there are changes in funding levels).
- Risk avoidance or reluctance by agencies to enter into agreements.
- Complexity of interagency agreements.
- Lack of state legislative authority for LPAs to enter into agreements.
- Lack of long-term cooperative agreements between state DOTs and LPAs.
- Short tenure of key personnel at different agencies.
- Insufficient availability of state DOT right-of-way staff to support or assist with LPA right-of-way activities.
- Delays by federal agencies in responding to state requests to acquire property. Some survey participants indicated that GSA is slow to transfer property for federal-aid projects even when there has been no need to transfer funds. In addition, GSA does not share its appraisals with the state DOT, even though the state provides its appraisal to the federal government.

Strategies for improvement or optimization include:

- Assign state DOT right-of-way personnel to provide oversight and/or advisory support to LPAs. Legal personnel experienced in real estate should also be involved, especially if large or complex real property acquisitions are expected.
- Engage external stakeholders, including the FHWA division realty specialist, in situations that involve potentially large or complex real property acquisitions. Part of the responsibilities of state DOT right-of-way personnel is to develop relationships with the appropriate representatives of the various federal, state, and local agencies.
- Execute multi-level MOUs with LPAs, federal agencies, tribes, and other agencies that outline long-term and short-term goals, describe rights and responsibilities, and provide a framework that generates trust between the parties. Well-structured multi-level MOUs can facilitate the execution of project-level agreements to acquire real property needed for transportation projects.

Alternative Analysis and Preliminary Plans

Conduct Conceptual Design Meeting

Issues and challenges include:

- Not involving right-of-way personnel in preliminary design activities, or underestimating the importance of involving right-of-way staff in preliminary design activities. Involving right-of-way personnel is particularly critical when the need to do so may not be readily apparent to project managers (e.g., meeting federal and state accessibility requirements, identifying real property requirements and challenges to support environmental commitments, and identifying potentially challenging locations from a real property acquisition and relocation assistance perspective).
- Not identifying clearly the need to collect information about land uses, archaeological sites, easements, potentially problematic or challenging real property acquisitions, and control of access to the roadway right-of-way.

Strategies for improvement or optimization include:

- Ensure that right-of-way personnel are consistently engaged in conceptual design meetings. Legal personnel experienced in real estate should also be involved, especially if large or complex real property acquisitions are expected.
- Seek executive-level commitment for early engagement of right-of-way staff in the project development process and be willing to raise concerns proactively to executive management if this early engagement is not occurring on projects.

Collect Data for Preliminary Design

Issues and challenges include:

- *See* Conduct Conceptual Design Meeting.

Strategies for improvement or optimization include:

- *See* Conduct Conceptual Design Meeting.
- Formalize the use of forms and procedures to conduct an assessment of real property and relocation assistance impacts within the proposed project limits as part of the process to collect data for preliminary design and identify any anticipated special acquisition requirements and/or relocation impacts, such as lack of replacement housing for displaced residences or local economic impacts by displacing large businesses. The procedure should include transcribing the results of the assessment to project summary checklists and forms to prepare or update the project scope.

Obtain Permission to Enter Property

Issues and challenges include:

- Ambiguity in state law, which may not clearly give an agency the right of entry for survey purposes even when the agency clearly has the right to acquire a property by eminent domain.
- Inadequate coordination with property owners who, because they are not familiar with (or have concerns about)

the project, do not initially allow agency-authorized personnel to enter the property.
- The first communication with property owners about a potential project taking place in person with members of the environmental teams, surveyors (or other agency-authorized officials) who are attempting to enter a property for survey purposes, soil core sampling, species assessments, and other similar activities.

Strategies for improvement or optimization include:

- Clarify state laws about the right of an agency to enter a property for survey purposes if the property is being assessed for potential acquisition as part of a transportation project.
- Coordinate early and often with property owners who may be potentially affected by a proposed transportation project.

Conduct Value Engineering Study

Issues and challenges include:

- Not involving real property subject matter experts as part of the teams that conduct VE studies.

Strategies for improvement or optimization include:

- Require the inclusion of real property subject matter experts on the teams that conduct VE studies, including design-build projects. Legal personnel experienced in real estate should also be involved, especially if large or complex real property acquisitions are expected.
- Modify VE study procedures to require the evaluation of opportunities to reduce or eliminate real property impacts, as well as the assessment of potential cost savings.

Environmental Process

Prepare Draft Environmental Documentation

Issues and challenges include:

- Not involving right-of-way personnel in environmental process activities, or underestimating the importance of involving right-of-way staff in the environmental process.

Strategies for improvement or optimization include:

- Ensure that right-of-way personnel are consistently engaged in the environmental process. Legal personnel should also be involved, especially if large or complex real property acquisitions might be expected.
- Have a senior right-of-way agent assigned to every transportation project. This agent is a member of the project team, attends public meetings, and has the overall responsibility to ensure the project is cleared on time to meet bid date requirements.
- Involve an FHWA realty specialist early when potential exists for situations that might require a conditional environmental clearance or a federal land transfer.
- Involve right-of-way personnel in the use and application of planning and environmental linkage (PEL) techniques.
- Identify and document environmental justice (EJ) and limited English proficiency (LEP) population impacts early.

Conduct Public Meetings

Issues and challenges include:

- *See* Prepare Draft Environmental Documentation.
- Not using appropriate visualization or public outreach tools to effectively communicate with property owners.

Strategies for improvement or optimization include:

- *See* Prepare Draft Environmental Documentation.
- Utilize appropriate visualization tools (including animations, 3D visualizations, and other techniques) to explain the project and illustrate anticipated benefits and impacts to property owners, utility owners, other stakeholders, and the public.
- Train public relations personnel on real property acquisition laws, regulations, concepts, and procedures to reduce the risk of misinforming stakeholders and the public when addressing property acquisition topics and issues.
- Develop stakeholder outreach and public awareness programs that include a systematic approach for addressing property owner concerns to change the public perception of acquisition of private property under eminent domain.

Meet Environmental Commitments After Clearance

Issues and challenges include:

- Lack of a monetary hold to address environmental issues associated with a property. The presence of environmental contamination within a property can decrease the value and usability of the property. If it is necessary to acquire contaminated property as part of a transportation project, the agency's preference is usually for the owner to remediate the site prior to the purchase. However, this option might not be realistic (e.g., because of urgency or location characteristics). In this case, the agency acquires the property

and pays for the remediation. The agency might go to trial to recover the costs, but frequently, the agency ends up absorbing the cost because the likelihood of recovering the cost through litigation is small. A similar situation occurs if existing contamination migrates from an adjacent property to the real property the agency has acquired. The agency either requires the responsible party to remediate the contamination or pays for the remediation and then attempts to recover the costs.
- Difficulty tracking environmental commitments and mitigation efforts (including maintenance requirements) after project construction has ended.

Strategies for improvement or optimization include:

- Make sure that plan sheets depict environmental commitments clearly.
- Take remedial actions to reduce the risks and impacts from contamination on the property to a manageable level. It is not always necessary to achieve pre-contamination levels.
- Implement a tracking system to monitor all environmental commitments and mitigation efforts through the construction phase and, if appropriate, during operations and maintenance.

Conduct Environmental Reevaluation

Issues and challenges include:

- Not involving right-of-way personnel in environmental reevaluations, or underestimating the importance of involving right-of-way staff in environmental reevaluations.
- Not being proactive reaching programmatic agreements with FHWA outlining specific delegations and authority to streamline environmental reevaluations. The courts have generally stated that if a reevaluation addresses a significant impact that should have been addressed in the original environmental document, a supplement is required to fill any gaps, and more reporting is necessary. Rapidly developing areas frequently experience land use and population changes. However, these changes do not necessarily rise to the level of a significant impact. A programmatic agreement with the respective FHWA division would help to address this issue. It is also important to keep in mind that, for environmental litigations, a review of the record of the agency as a whole is frequently necessary.

Strategies for improvement or optimization include:

- Use standardized forms, including e-forms, to conduct environmental reevaluations. One of the reasons is that court decisions are clear that a complete, accurate administrative record must explain the factors and impacts that were re-evaluated and include a decision rationale. Standardized forms can be useful to address this requirement. In many cases, documentation includes keeping a record of negative declarations that justify decisions that find no negative environmental impacts.
- Develop and implement interagency agreements between the state DOT and FHWA that contain specific delegations for environmental reevaluations (*56*).

Design and PS&E Assembly

Conduct Design Meeting

Issues and challenges include:

- Not involving right-of-way personnel throughout the design phase, or underestimating the importance of involving right-of-way staff early on during the design phase.
- Pressure at many state DOTs to accelerate or compress the design phase in an effort to shorten the development and delivery of transportation projects.

Strategies for improvement or optimization include:

- Ensure that right-of-way personnel are consistently engaged throughout the design phase. Legal personnel should also be involved, especially in large or complex real property acquisitions.
- Use scheduling software to manage the acquisition of real property, including the identification of critical path activities and an analysis of what-if scenarios to anticipate potential impacts both to the project itself and the specific activities required to support the acquisition of real property. The software should also be used to manage relocation assistance advisory and payment services.
- Develop reporting tools such as red-flag summaries to identify situations that might result in significant project delays in connection with real property activities (e.g., real properties that would likely end up in condemnation proceedings).
- Request input from right-of-way personnel when determining the anticipated letting date, including measures such as anticipated duration of the real property activities and dispersion measures (typical range and standard deviation).
- Include a provision in design-build projects requiring the design-builder to coordinate with agency right-of-way personnel for the definition of appropriate lead times for the completion of real property acquisition activities. For design-build projects, it is common for the state DOT to retain right-of-way responsibilities. The exception could be temporary easements, in which the design-builder may have flexibility to complete this activity on its own.

Typically, agencies hand off the project to a design-builder after completing the schematic and identifying the project footprint. A default lead time could be included in the contract (e.g., 18 months to acquire real property after the authorization to acquire property has been issued or after receiving an updated right-of-way map depicting updated property requirements). However, the contract should also include a provision to allow different durations for specific situations depending on the complexity of the acquisition and/or relocation activities involved.

Develop Final Horizontal and Vertical Alignments

Issues and challenges include:

- *See* Conduct Design Meeting.
- Changes in horizontal or vertical alignment that alter the project limits and, therefore, affect the real property acquisition scope, schedule, and cost. This issue becomes more critical as the design phase advances and the agency has less flexibility to reallocate resources to meet the original letting schedule.
- Inadequate project design, which causes inaccuracies in the determination of real property needed for the project.

Strategies for improvement or optimization include:

- *See* Conduct Design Meeting.

Conduct Detailed Design

Issues and challenges include:

- *See* Conduct Design Meeting.
- Design changes that alter the project limits and, therefore, affect the real property acquisition scope, schedule, and cost. As with the development of final horizontal and vertical alignments, the issue of design changes becomes more critical as the design phase advances and the agency has less flexibility to reallocate resources to meet the original letting schedule.

Strategies for improvement or optimization include:

- *See* Conduct Design Meeting.

Conduct 30 Percent, 60 Percent, and 90 Percent Design Meetings

Issues and challenges include:

- *See* Conduct Design Meeting.

Strategies for improvement or optimization include:

- *See* Conduct Design Meeting.

Prepare PS&E Package

Issues and challenges include:

- *See* Conduct Design Meeting.

Strategies for improvement or optimization include:

- *See* Conduct Design Meeting.
- *See under* Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance:
  - Prepare Right-of-Way Certification.

Conduct Final Design and Initial Construction Coordination Meetings

Issues and challenges include:

- *See* Conduct Design Meeting.
- Not involving right-of-way personnel if some real property acquisition activities will be continuing during the construction phase.

Strategies for improvement or optimization include:

- Ensure that right-of-way personnel are consistently engaged throughout the design phase and during construction, particularly if real property still needs to be acquired during the construction phase. Legal personnel also should be involved, especially in large or complex real property acquisitions.
- Allow for construction clearance approvals on a parcel-by-parcel basis similar to design-build project provisions.

Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance

Provide Planning and Real Property Acquisition Linkages

Issues and challenges include:

- *See under* Definition, Selection, Financing, and Scheduling:
  - Prepare Cost Estimate and Identify Funding Sources.
  - Secure Federal, State, and Local Agreements.

Strategies for improvement or optimization include:

- *See under* Definition, Selection, Financing, and Scheduling:
  - Prepare Cost Estimate and Identify Funding Sources.
  - Secure Federal, State, and Local Agreements.

Conduct Real Property Research

Issues and challenges include:

- *See under* Alternative Analysis and Preliminary Plans:
  - Collect Data for Preliminary Design.
  - Obtain Permission to Enter Property.
- *See under* Environmental Process:
  - Prepare Draft Environmental Documentation.

Strategies for improvement or optimization include:

- *See under* Alternative Analysis and Preliminary Plans:
  - Collect Data for Preliminary Design.
  - Obtain Permission to Enter Property.
- *See under* Environmental Process:
  - Prepare Draft Environmental Documentation.
- Start the title search and appraisal process (without negotiation) as part of the preliminary design phase. For early analyses, assume total acquisitions in all alternatives. As needed, this strategy might involve hiring in-house or consultant appraisers earlier in the process.
- Document situations that might involve advance acquisitions.
- Document situations that might involve hardship acquisitions as well as situations that might involve protective buying acquisitions (which can be done after the agency has notified the public that it has selected a preferred alignment, or a public hearing has been held or an opportunity for the hearing has been afforded).

Coordinate with Other Stakeholders

Issues and challenges include:

- *See under* Alternative Analysis and Preliminary Plans:
  - Collect Data for Preliminary Design.
  - Obtain Permission to Enter Property.
  - Conduct Value Engineering Study.
- *See under* Environmental Process:
  - Prepare Draft Environmental Documentation.
  - Conduct Public Meetings.
- Unreasonable delays in the coordination with other state and federal agencies on federal land acquisitions.
- Unreasonably short timeframe to interact with property owners and other stakeholders effectively and fairly.
- Limited or ineffective interaction with property owners and tenants, which increases the risk of confusion and misunderstandings that could have financial implications for the agency. Confusion might occur, for example, when tenants in an apartment complex learn that they might need to move and the message from the agent is ambiguous about timing or suggests that the move is imminent when in reality it may be years away. As a result, tenants begin to move out, negatively affecting the property owner's ability to conduct business, resulting in an economic loss for which the agency could be held liable.
- Other stakeholders not identifying a central point of contact for interactions with the agency, including negotiations, acquisitions, relocation assistance, and payments.

Strategies for improvement or optimization include:

- *See under* Alternative Analysis and Preliminary Plans:
  - Collect Data for Preliminary Design.
  - Obtain Permission to Enter Property.
  - Conduct Value Engineering Study.
- *See under* Environmental Process:
  - Prepare Draft Environmental Documentation.
  - Conduct Public Meetings.
- Proactively identify and develop a working relationship with critical points of contact at other agencies that interact with the state DOT to facilitate coordination in all aspects of the real property acquisition process.
- Include longer lead times (based on historical experience) in the project schedule if a federal land transfer or other interagency coordination is expected, thus setting expectations within the state DOT that acquisition activities may take longer than normal for the project.
- Develop guidelines for interacting with property owners and tenants to ensure the agency provides adequate information to potential displaced persons, while minimizing the risk of confusion and misunderstanding that could have financial implications for the agency.

Prepare Right-of-Way Map and Property Descriptions

Issues and challenges include:

- Low level of quality and completeness of right-of-way maps.
- Errors in the calculation of the area of the real property to be acquired, causing multiple revisions in a variety of critical documents that depend on the accuracy of that calculation and affecting subsequent real property acquisition activities.
- Using parcel sketches that are not supported by proper survey control, resulting in deliverables that cannot be

integrated with other project development and delivery process activities.
- Frequent project changes that result in modifications to the amount of real property that needs to be acquired and, therefore, in the time it takes to complete right-of-way maps.
- Inconsistency in the use of CAD libraries, protocols, and standards during the preparation and production of right-of-way maps.
- Lack of expertise by consultants when preparing right-of-way maps.
- Higher costs for contractor-prepared right-of-way maps than originally anticipated. In one example mentioned in the survey, the official cost to prepare right-of-way maps using contractors was only slightly higher than what the cost would have been using in-house forces. However, the agency ended up spending a significant amount of time supervising and reviewing the contractors' work. The state DOT estimated that the total cost was twice as much when using contractors than if the state DOT had done the work internally.

Strategies for improvement or optimization include:

- Enforce CAD protocols and standards strictly to ensure the quality and completeness of right-of-way maps.
- Enforce the requirement for every parcel to be properly documented using accepted survey standards and procedures, including the identification of parent tracks, taking areas, and remainder areas, as well as the integrated calculation of those areas.
- Upgrade CAD design libraries with a goal to support long-term property management strategies, including the use of GIS-based techniques to support those goals.
- Upgrade CAD and survey standards to make both real property information and final survey products part of the deliverables to the agency and long-term document archival practices.

Obtain Authorization to Acquire Real Property

Issues and challenges include:

- Inconsistency across states regarding definitions of advance or early acquisitions, and inconsistency between the definition of early or advance acquisition in 23 CFR and the definition of advance acquisition in 23 U.S.C. 108.
- Conducting real property acquisition activities without the proper authorization. Streamlining, for example, should not result in the loss of property rights or the property owners' right to due process. Appraising properties without completing the right-of-way map is streamlining but does not allow for due process.

Strategies for improvement or optimization include:

- Standardize or clarify definitions in 23 U.S.C. 108 and 23 CFR.
- Implement online information systems to facilitate the review of documentation needed for the authorization to acquire property.

Conduct Appraisal or Waiver Valuation

For activities that are explicitly accounted for in the Uniform Act, from appraisals to relocation payments, the following issues, challenges, and strategies are disaggregated into the following categories: Uniform Act; federal regulations; and policies and procedures.

Issues and challenges associated with the Uniform Act include:

- Lack of a proper definition in the Uniform Act for what constitutes a low fair market value.

Issues and challenges associated with federal regulations include:

- Routinely requiring appraisals for low-value, non-complicated parcels.
- Federal land acquisition appraisals taking significantly longer to prepare than other properties. As a reference, federal land acquisition appraisals frequently follow the *Uniform Appraisal Standards for Federal Land Acquisitions* (also called the "yellow book") (*57*).

Issues and challenges associated with policies and procedures include:

- *See* Prepare Right-of-Way Map and Property Descriptions.
- Having to re-conduct the appraisal or waiver valuation if there are changes to the right-of-way map, often adding months to the process.
- Lack of specifications and forms or insufficient specifications and standardized appraisal forms, resulting in lack of uniformity in appraisal approaches and lower quality appraisals. The resulting appraisals may be deficient in content, comparable research may be inadequately conducted or documented, value conclusions may be unreliable, and damages may be unsupported. A related problem is the lack of adequate procedures in place to deal with appraisers that do not follow specifications, deliver a low quality product, or do not meet deadlines. Unfortunately,

because of a lack of performance guidelines, the result in these situations is frequently to decide to continue working with the same contractor instead of imposing penalties or hiring new contractors.
- Not following proper procedures for conducting appraisals in the case of donations.
- Inadequate appraiser expertise to appraise billboards properly and outdoor advertising companies not sharing data needed to produce complete appraisals.
- Assigning a fixed, arbitrary number of appraisals to one appraiser without taking into account factors such as parcel size and complexity, required time and effort to conduct the appraisal, which makes it difficult for an appraiser to complete all assigned appraisals on time and prevents agencies from developing and managing reasonable real property acquisition work schedules.
- Difficulty finding qualified or experienced appraisers. For example, appraisers may be qualified in general terms but may not be familiar with state-specific regulations and policies. Similarly, appraisers may have insufficient training for conducting appraisals for transportation projects, which often include partial acquisitions and special situations such as abandoned railroad real property or crossings.
- Operating or abandoned railroad property appraisals taking significantly longer to prepare than other types of properties because of difficulties in coordinating with railroad companies.
- Appraisal contracts that tie payments to the number of appraisals conducted but do not include robust performance measures related to appraisal quality and completeness.
- Requiring two levels of appraisal review without taking into consideration whether the second review is always warranted or needed—a requirement that can add several months to the process.
- Difficulty assessing the impact on appraisals related to the termination of leases that are valuable to the property owner or to a tenant depending on whether the leases are above or below market values.

Strategies for improvement or optimization associated with the Uniform Act include:

- Introduce the concept of, and provide a definition for, uncomplicated real property, and specify a regulatory procedure to distinguish between uncomplicated and complicated real property for identifying when a waiver valuation is acceptable. One advantage of using a threshold tied to the concept of uncomplicated real property (as opposed to low fair market value) is that it introduces flexibility by focusing on the need to conduct formal appraisals as a function of the level of complexity and risk associated with the appraisal instead of an artificial, fixed monetary threshold. Alternatively, states could define the threshold to distinguish between complicated and uncomplicated real property. In this case, states would need to determine a reasonable appraisal waiver limit for uncomplicated parcels, which could be either fixed or variable depending on the location. For example, high-cost areas or cities would have a higher waiver threshold than low-cost areas or cities. The threshold could be based on historical data and/or county assessment data. The procedure and/or thresholds for individual states could be subject to review and approval by FHWA.

Strategies for improvement or optimization associated with federal regulations include:

- Establish a tiered approach for determining when it is necessary to conduct appraisals and appraisal reviews. For example, if the anticipated value is less than $25,000, the appraisal and formal reviews would be waived. If the appraisal is greater than $25,000 and less than $500,000, the appraisal would require an expedited review at the district level. If the appraisal is greater than $500,000, the appraisal would, in addition, require a review at the division or central office level. For properties that are already on the market, the agency would be able to certify the value and make a written offer based on an evaluation of the asking price.
- Make greater use of the increased flexibility provided by MAP-21 to start the appraisal process before the completion of the environmental review. Provisions enabling the use of federal funds for the early acquisition of real property prior to completion of the environment approval are included in 23 U.S.C. 108(c) and (d).

Strategies for improvement or optimization associated with policies and procedures include:

- Implement a protocol for updating appraisals in areas or situations where market values tend to change rapidly. The protocol would address cases where a complete reappraisal is necessary and cases where an expedited appraisal or waiver valuation might be sufficient. This type of protocol could also be used to update appraisals if design changes result in changes to real property requirements.
- Assign appraisal jobs using a list of pre-approved or pre-certified appraisers to avoid or minimize delays associated with the procurement process. The list could be updated at pre-specified intervals (e.g., at the beginning of the fiscal year). State DOTs could recommend or require LPAs to use appraisers from the state DOT approved list. State agencies could also offer to pay for a property owner's appraisals as long as the appraiser is pre-certified by the agency and there is an agreement to disclose the appraisal or the data used for the appraisal.

- Develop well-written scopes of work with input from both appraisers and reviewers. A related strategy involves communicating with all appraisers who will work on a project (potentially during a project kick-off meeting) to explain the policy and procedures for determining items such as uneconomic remnants, reasonableness of access, when it is necessary to acquire access rights versus using police powers, and what to look for in permits. This strategy ensures uniformity in appraisal approaches and an adequate base knowledge and consistency to prevent review appraisers from having to struggle with last-minute changes. Involving other real estate and legal personnel in those meetings is also helpful to ensure clarity and uniformity across the board.
- Require appraisers to understand the need for contributory value, personal versus real property, and tenant versus fee owner impacts on acquisition and relocation.
- Use standardized appraisal forms with clear instructions about the information needed for each section. This strategy provides new appraisers with direction and enables them to work more independently. It also reduces paperwork and saves time during negotiations and condemnation proceedings, as well as when preparing right-of-way certifications. AASHTO could serve as a clearinghouse for templates, forms, and business practices.
- Simplify legal description requirements for acquisitions less than a certain threshold.
- Procure appraisal and appraisal review services through a method other than a low-bid process and set up a performance measurement system that focuses on appraisal quality instead of just the number of appraisals completed by contractors. A reliable appraisal audit program should be in place to verify appraisal quality and the effectiveness of the performance measurement system.
- Allow minor appraisal adjustments to be made by making redline appraisal adjustments in CAD-generated deed descriptions.
- Implement administrative appraisal reviews instead of (or before) full technical reviews. An administrative review could still result in a full technical review of the appraisal in question if warranted.
- Leverage previous research conducted by FHWA (*6*), conducting research on federal land acquisition appraisals to develop a better understanding of why federal land acquisition appraisals take significantly longer to prepare than appraisals for other properties.

Establish Just Compensation

No issues and challenges associated with the Uniform Act or with federal regulations were identified in relation to establishing just compensation. Issues and challenges associated with policies and procedures include:

- Incentives added to the just compensation amount that have a negative impact on residential relocation assistance payments if the total budget for acquisitions and relocation assistance is fixed.

Under these circumstances, adding an incentive to the amount believed to be just compensation has the effect of reducing the amount left for residential relocation assistance services.

No strategies for improvement or optimization associated with the Uniform Act or with federal regulations were identified. Strategies for improvement or optimization associated with policies and procedures include:

- Develop a multitier approach to enable districts, not only the central office, to establish just compensation for acquisitions below a certain threshold. For example, a district could be responsible for establishing just compensation if the fair market value is below a certain threshold. The central office could be responsible for establishing just compensation if the fair market value is equal to or greater than that threshold.
- Separate incentives from the amount believed to be just compensation. By untying incentives from the establishment of just compensation, the amount available to provide relocation assistance to property owners would not be reduced.

Prepare and Make Written Offer

No issues and challenges associated with the Uniform Act were identified. Issues and challenges associated with federal regulations include:

- Current business practices not encouraging agencies and property owners to use a fixed, non-negotiable period during which property owners can review the offer. As a result, property owners often do not respond to the offer on time, causing delays in the acquisition process or leading the process to condemnation proceedings. Federal regulations are not prescriptive on this issue, suggesting but not requiring that agencies provide a 30-day period to a property owner to review the offer.
- Lack of standards on the level of language complexity used in offer letters. According to the regulations, all notices to property owners must be in plain, understandable language. The lack of an appropriate standard often causes confusion about what acceptable language and terminology to use, however, which can lead to problems for property

owners who may lack the background or knowledge needed to understand the terms used in the offer letter.

Issues and challenges associated with policies and procedures include:

- Difficulty identifying the owner of record when several entities own the real property or because of the corporate structure associated with the ownership.

Strategies for improvement or optimization associated with the Uniform Act include:

- Enable the use of electronic communications to make the offer, including email and web-based protocols. At a minimum, use these technologies before the first person-to-person meeting, although depending on the situation, it might be possible to conduct the entire negotiation and acceptance of the offer electronically. A critical requirement is to implement an offer receipt protocol that the agency, the property owner, and the courts can find acceptable. This strategy has the potential to offer significant time and cost savings. However, it would be necessary to conduct pilot studies to identify potential implementation barriers, challenges, best practices, and appropriate tools. A potential challenge is the loss of personal contact and rapport with property owners. Agencies would need to consider different ways of communication, depending on the needs and sometimes the preferences of each property owner.

Strategies for improvement or optimization associated with federal regulations include:

- Provide property owners with a clear statement (along with the written offer) setting up the maximum duration for negotiations and the conditions under which an agency can extend this period. This statement is critical because property owners need to be fully aware of the timeline they have so they can take all the actions necessary to review and respond properly to the offer. To ensure credibility, property owners should be able to request an extension to the negotiation period. The conditions under which extensions are allowed should be strict and applied consistently; however, for flexibility, these conditions could vary depending on the project and the type of real property acquisition involved.
- Implement a streamlined process for low-cost temporary easements by allowing a field agent to complete the acquisition with one face-to-face meeting. The initial contact can be made by phone to review the land title and other property information. All remaining pre-acquisition activities also can be completed before the first visit when the written offer is presented to the property owner.

Strategies for improvement or optimization associated with policies and procedures include:

- Require presentation of the appraisal at the time of the offer. A well-presented offer helps property owners understand the project impacts to their property, which can save time during negotiations and result in cost savings and less litigation. A carefully drafted appraisal that properly documents impacts and the basis for the analysis is extremely valuable, not just for determining the fair market value of the real property but also for facilitating communication among all stakeholders.
- Use appropriate visualization techniques, including 3D models and virtual reality animations, to improve communications with property owners, thus helping to minimize delays and reduce the likelihood that the acquisition will go to condemnation.

Acquire by Negotiation

Issues and challenges associated with the Uniform Act include:

- Use of the eminent domain power by pipeline and electric transmission line operators causing difficulties for transportation agencies that are negotiating acquisition and relocation options with property owners (e.g., if the urgent need to complete a pipeline or electric transmission line project results in higher payments to property owners). In these cases, the pressure on transportation agencies increases because property owners tend to increase their monetary demands.

Issues and challenges associated with federal regulations include:

- Inadequate time provided to a property owner to review the written offer. Federal regulations are not prescriptive on this issue; 49 CFR 24 suggests but does not require that agencies provide a 30-day period to a property owner to review the offer. Some state agencies attempt to accelerate the acquisition of real property by giving little time to property owners to review the offer. This practice is counterproductive because it can generate resistance from property owners, often leading to condemnation, increasing overall costs, and delaying the entire process.

Issues and challenges associated with policies and procedures include:

- Lacking a mandatory or recommended mediation period before a real property acquisition can proceed to condemnation proceedings, which can result in a higher number

of acquisitions going to condemnation, causing additional delays and higher acquisition costs.
- Delays caused by having to wait a certain number of days (e.g., 30 days in Florida) between reaching a purchase agreement and the actual closing.
- Delays caused by having to obtain individual signatures from each property owner when the acquisition involves common areas in condominiums.
- Reimbursing property owners for attorney fees during condemnation proceedings but not during the negotiation phase, a practice that gives property owners an incentive to proceed with litigation rather than reach an agreement through negotiations.
- External entities (e.g., law firms) advising property owners not to negotiate as a tactic to obtain more money during condemnation proceedings.
- Contractors summarizing negotiations as reaching an impasse when more negotiations would be appropriate. Many agencies use a low-bid procurement process and a per-parcel billing system for real property acquisition contracts. This contractual structure tends to encourage contractors to finalize negotiations in the least amount of time in an effort to maximize their profit. In addition, after receiving payment for their services, contractors might be unavailable or unwilling to have follow-up meetings with property owners. Agencies may then be forced to find new negotiators who need extra time to develop rapport and a working relationship with the property owners.
- Contractors being less responsive to property owners than agency personnel, having fewer in-person and follow-up meetings with property owners, or not being sufficiently familiar with the project area and therefore lacking credibility with property owners. The contracting structure at many agencies leads contractor agents to work on multiple projects, limiting their availability to work on each individual project. One result of this structure is property owners not recognizing contractors as valid agency representatives, preferring to deal directly with state DOT officials or deciding against negotiations in favor of litigation. Property owners often prefer to work with contractors who understand the local market and specific characteristics of the area. Trust issues can arise if the appraisal is not based on updated, local data, or if it has been conducted elsewhere by out-of-area agents.
- Hourly billing contracts not being monitored properly, either because of inadequate resources or because of inadequate project management experience at the agency. Some agencies use an hourly billing system that requires contractors to spend a minimum number of hours per week with property owners (while also requiring that the total cost of negotiations per parcel not exceed an upper limit). In practice, issues can arise with allocating the necessary resources to manage this type of contract, including having experienced agency or contract personnel and the availability to manage the contractors effectively.
- Having to execute separate contracts for related services such as titles and closings. Current practices vary from state to state. Some agencies support title transfers and closings through separate procurement processes, which can result in additional delays.
- Differences in perception between agencies and property owners about the purpose of the negotiation phase, which may have a negative impact on the agency's ability to acquire property through negotiations. Many property owners believe that the state DOT has a tendency to "lowball" valuations and that the negotiation phase is their only opportunity to restore the balance through a back-and-forth process that can take as long as necessary until balance is reached. In contrast, the view at many agencies is that the purpose of the negotiation phase is to make an offer, stick with that offer as much as possible, and require a strong justification for any variation from that offer.
- Risks and unknown parameters associated with the lump-sum payment demonstration program in MAP-21. The main purpose of this initiative is to expedite the acquisition of residential property, avoid condemnation proceedings, and decrease administrative costs. Lump-sum payments include both acquisition and relocation assistance. A potential risk of not separating these two payments is that displaced property owners may not be aware of all the potential relocation risks and costs (because the lump-sum payment is agreed upon before the relocation takes place), potentially resulting in an economic loss for that property owner. In addition, interest by attorneys in lump-sum-payment cases will likely increase because of the possibility of higher fees (since the payments are combined) than would be the case if the payments were separated, resulting in lower net payments to displaced property owners.

Strategies for improvement or optimization associated with the Uniform Act include:

- Introduce legislation to make pipeline and electric transmission operators subject to Uniform Act provisions whenever they acquire real property through the power of eminent domain, regardless of whether the acquisition involves federal funds. This practice would level the playing field between pipeline and electric transmission operators and transportation agencies should both groups of organizations need to acquire real property in the same area or region. The legislation could also encourage or require effective communication and coordination among stakeholders, particularly if multiple projects by multiple agencies can cause an upward pressure in property valuations.

Strategies for improvement or optimization associated with federal regulations include:

- Require (not simply suggest) agencies to provide property owners with enough time to review an offer. Regulations need to be more prescriptive on this matter, requiring a minimum duration instead of simply suggesting a minimum duration. (Current regulations suggest 30 days as the minimum time needed to review an offer.) The required minimum duration should be reasonable and adequate for property owners to take all the necessary actions to review and respond to an offer properly. This duration could vary depending on the characteristics and complexity of the real property (e.g., 30 days for a small residential unit with a fair market value below a certain amount, but 60 days for more complex properties).
- Make the use of possession-and-use agreements a standard practice. According to regulations, possession-and-use agreements are intended for use on an isolated basis, but in practice they are used more frequently. These agreements enable an agency to take possession of a property before closing to conduct all activities necessary for the project, and can extend to the agency's contractors and permitting of utility facilities. As part of the agreement, the state pays an agreed-upon amount (which could be the fair market value or a percentage of this value) to the grantor, and this amount is then deducted from the final settlement amount or award (if the acquisition goes to condemnation).

Strategies for improvement or optimization associated with policies and procedures include:

- Develop a multitier approach for assigning and conducting negotiations. For example, for low-value, uncomplicated properties, an unlicensed real estate agent could conduct and finalize negotiations with the property owner. For real property with a fair market value greater than $25,000 and less than $500,000, a certified agent would need to conduct the negotiation. If the fair market value is greater than $500,000, a certified, pre-approved negotiator (perhaps with concurrence from the central office) would need to conduct the negotiation.
- Make the use of acquisition incentives a standard practice to facilitate direct negotiations with property owners. The incentive amount could be based on or vary according to the amount of the written offer. However, if an appraisal conducted by the property owner is above the agency-approved appraisal or if the negotiated amount is higher than the agency-approved appraisal, the higher amount would be used to determine the incentive amount. If incentives are used on a project, the incentives should be available to all property owners affected by the project. Properties undergoing condemnation proceedings would not be eligible for an incentive. This strategy is applicable where state laws allow incentive payments.
- Implement contracting practices that take into consideration the need for production, while at the same time guaranteeing property rights and the need for contractors to spend quality time with property owners. Examples of potential practices include:
  - Introducing flexibility by, for example, screening bidders and requesting a best and final offer (BAFO) from the selected bidders. The agency then makes a final determination based on criteria such as best meeting the goals and objectives of the solicitation, best meeting quality and reliability requirements, effect on productivity, most customer-focused solution, and agent experience.
  - Developing a list of pre-approved agents based on past performance evaluation results. Pre-approved agents tend to command higher fees, but the higher cost can easily be absorbed in the form of higher negotiation success rates, which, in turn, results in lower condemnation rates.
  - Developing specific contract scopes that clearly indicate what the agency expects instead of making a general statement that the contractor will provide negotiation and relocation assistance services.
  - Using milestones and attaching performance measures to each milestone as part of the billing and payment process. For example, the Texas DOT has established three milestones for the release of partial payments to contractors. The first payment (25 percent of the total cost of a contract) is released upon presentation of the offer to the property owner, the second payment (45 percent) is released upon presentation of the final offer, and the remaining 30 percent is released upon closing.
  - Including productivity and performance objectives as part of the billing and payment process when using professional contract or hourly billing services for negotiations. Some agencies (e.g., the Virginia DOT) have established an hourly billing system that requires contractors to spend a minimum number of hours per week with property owners and requires that the total cost of negotiations per parcel cannot exceed an upper limit. This strategy requires the agency to allocate project managers with experience in the management of this type of contract and the use of performance measures that look at the acquisition process in a holistic manner.
  - Conducting surveys of property owners about their experience and interaction with negotiators. On completion of the negotiation process, and regardless of its outcome, agencies would collect feedback about the effectiveness of internal and external agents and use this information, along with other performance measures, to assess agents and develop a list of approved agents.

- Eliminate the requirement for a 30-day holding period between reaching a purchase agreement and the actual closing.
- Make the use of possession-and-use agreements a standard practice to enable the agency to take possession of a property before closing during the negotiation phase.
- Monitor the progress and results of the MAP-21 demonstration program for lump-sum payments. The program is intended to streamline the relocation process for residential owner-occupants by allowing a lump-sum payment for acquisition and relocation assistance if elected by the displaced occupant. A positive aspect of providing this type of payment is the added flexibility for property owners to be able to handle the payments they receive from the agency. However, as mentioned previously, certain risks will need to be monitored, including property owners not being fully aware of the actual relocation costs they might incur.
- Establish or recommend a mandatory mediation period before a property acquisition can proceed to condemnation. Mediation can accelerate the resolution of cases, compared to waiting for a trial date and going through the condemnation process, therefore increasing the number of properties that can be acquired during the negotiation phase. This process can also help agencies understand why negotiations were unsuccessful at first and identify strategies to address those deficiencies.
- Allow condominium owners' associations to represent and sign for all interested parties when the state DOT acquires common areas in condominium properties. Payments could be made to the association for disbursement to individual owners. This strategy would substantially reduce or eliminate the need to obtain individual signatures.
- Ensure that property owners understand the meaning and purpose of the negotiation phase to avoid confusion and misunderstanding about the process. Brochures, manuals, and other written documentation should describe clearly the purpose of and the activities conducted during the negotiation phase.
- Reimburse property owners for reasonable attorney and other subject matter expert fees incurred during the negotiation phase as a tactic to encourage the completion of the acquisition through negotiations. To ensure the integrity of the process, the agency should spell out ahead of time the conditions, limits, and protocols to follow (including defining what constitutes reasonable and how to proceed if the final offer is higher than the original offer).
- Implement a dual process in which the agency conducts negotiations and settlements while preparing the paperwork to go to condemnation proceedings. Although this strategy commits the agency to some additional costs to prepare condemnation materials that may not be used in every case, it can save valuable time if negotiations fail. This strategy needs to be implemented carefully to avoid the risk of coercion, including the prohibition of using it as a tool during negotiations with property owners. If the property owner is aware of the existence of the dual process, the acquisition agent must clarify its purpose to avoid confusion and misunderstanding.
- Use a pre-selected list of attorneys for titles and closings rather than having to contract these services for every acquisition as a mechanism to save time.

Acquire by Condemnation

No issues and challenges associated with the Uniform Act or with federal regulations were identified. Issues and challenges associated with policies and procedures include:

- State laws not allowing the use of the quick-take procedure to obtain possession prior to the determination of the award, making it necessary for agencies to wait until the end of the condemnation proceedings.
- Increased access to information online that leads property owners to decline negotiations and proceed with condemnation proceedings in an effort to receive higher payments. The range of public information available can vary from objective data that pertain to similar acquisition cases to speculative content that attempts to influence property owners into pursuing the condemnation route as a tactic to receive more money.
- State laws requiring the agency to absorb virtually all expenses incurred by both the state and the property owner during condemnation proceedings, which makes it more difficult to settle out of court and increases costs because there is no incentive for a property owner to negotiate.
- Not developing adequate documentation when preparing appraisals or conducting negotiations, which affects the agency's case if an acquisition goes to condemnation.
- State laws not limiting the duration of condemnation proceedings. The longer a condemnation action is unresolved, the more interest is earned on the outstanding amount. This situation is exacerbated by the application of interest rates accruing on condemnation claims or associated with possession-and-use agreements, which are too high compared to market conditions.
- State procedures resulting in inexperienced attorneys being appointed to handle condemnation proceedings for transportation projects, or attorneys being appointed who lack knowledge of the transportation project development and delivery process. The result of this practice is delays and additional costs.
- Lacking a mandatory or recommended mediation period before a real property acquisition can proceed to condemnation proceedings. The lack of a mediation process can

result in more acquisitions going to condemnation, causing additional delays and higher acquisition costs.

No strategies for improvement or optimization associated with the Uniform Act or with federal regulations were identified. Strategies for improvement or optimization associated with policies and procedures include:

- Adjust the interest rate accruing on condemnation claims or possession-and-use agreements to reflect market conditions.
- Introduce time limits for condemnation proceedings, including amending state laws to provide a timeframe for filing actions in condemnation cases and holding property owners accountable for missed field meetings, as these meetings require significant preparation and lead time.
- Introduce legislation limiting attorney fees up to a certain percentage of the award.
- Adjust schedules, budget, and resources based on data from adjacent projects. This strategy would allow agencies to manage a project by taking into account facts from other projects (e.g., condemnation rates) to capture real conditions that take place frequently and are likely to appear in the future.
- Require or recommend a mandatory mediation period before a property acquisition can proceed to condemnation. Mediation can accelerate the resolution of cases, therefore increasing the number of properties that can be acquired during the negotiation phase. This process can also help agencies identify strategies to address deficiencies in the negotiation process.

Demolish and Dispose Improvements

No issues and challenges associated with the Uniform Act or with federal regulations were identified. Issues and challenges associated with policies and procedures include:

- *See under* Environmental Process:
  - Meet Environmental Commitments After Clearance.
  - Conduct Environmental Reevaluation.
- *See under* Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance:
  - Coordinate with Other Stakeholders.

No strategies for improvement or optimization associated with the Uniform Act or with federal regulations were identified. Strategies for improvement or optimization associated with policies and procedures include:

- *See under* Environmental Process:
  - Meet Environmental Commitments After Clearance.
  - Conduct Environmental Reevaluation.
- *See under* Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance:
  - Coordinate with Other Stakeholders.

Prepare Right-of-Way Certification

No issues and challenges associated with the Uniform Act or with federal regulations were identified. Issues and challenges associated with policies and procedures include:

- Issues related to the quality and completeness of appraisals (e.g., appraisals that are deficient in content, comparable research that is not adequately conducted or documented, value conclusions that are unreliable, and damages that are not supported). Improperly documented appraisals can result in delays issuing right-of-way certifications.

No strategies for improvement or optimization associated with the Uniform Act or with federal regulations were identified. Strategies for improvement or optimization associated with policies and procedures include:

- Use standardized appraisal forms with descriptions of the information needed for each section. This strategy provides new appraisers with direction and enables them to work more independently. It also reduces paperwork and saves time during negotiations, condemnation proceedings, and while preparing right-of-way certifications.

Determine Relocation Assistance Eligibility

Issues and challenges associated with the Uniform Act include:

- Lack of a definition for the term "unlawful occupancy" in the case of non-residential property. The act only defines unlawful occupancy in the context of residential real property.

Issues and challenges associated with federal regulations include:

- Difficulty determining whether a person is lawfully present in the United States. One reason for this difficulty is the lack of reliable tools at the federal level to make this determination. Although agencies have had success with the self-certification provisions in 49 CFR 24, collecting information from persons who are illegally present in the United States is challenging because those persons tend not to volunteer information easily. Another challenge to the certification process is the difficulty relocation agents and state DOTs face in verifying the validity of documents such

as birth certificates, permanent residency cards, visas, and passports. A related issue is the liability that state agencies incur if they collect and archive copies of documents that contain personal identifiable information (PII). Another related issue that often arises in the field pertains to the safety of the agents who must interact with and collect information from individuals of unknown identity and intentions.

- Difficulty determining whether a person occupies a residential or non-residential real property unlawfully or whether someone has moved into such a property solely for obtaining relocation assistance services. One reason for this issue is the lack of a process or test that agents can use to reveal the true intention of the occupants of the property. An increase in the amount of reestablishment payments for businesses is likely to cause some businesses to move into a property only for obtaining relocation assistance services. This is also likely to happen if the reestablishment payment does not have a financial cap. This issue extends beyond the difficulty already described in connection with the Uniform Act because the act defines unlawful occupancy only in connection with residential property, whereas 49 CFR 24 refers to both residential and non-residential property.
- Difficulty determining that denying relocation assistance to a person who is unlawfully present in the United States would cause an exceptional and extremely unusual hardship to a spouse, parent, or child of that person. Although 49 CFR 24 provides a definition of what an exceptional and extremely unusual hardship is, in practice it can be very difficult to determine objectively that an exceptional and extremely unusual hardship is likely to occur. The case of a family that includes young or disabled children who are citizens of the United States is probably straightforward to assess (but the assessment is still subjective), but the case of a family where children are still minor, but older (e.g., age 15 years or 16 years), is more difficult.
- Difficulty determining relocation assistance eligibility for property owners whose center of economic activity is not located at the property to be acquired (e.g., in the case of a property owner whose business is renting property, but his/her business office is not located at the property being acquired). FHWA considers these property owners as displaced persons and, therefore, eligible for relocation assistance. However, no distinction is made between those whose center of economic activity is located at the property being acquired and those whose business office is located elsewhere. In practice, state agencies need to provide relocation assistance services to both property owner and displaced tenants, even when the property owner's center of economic activity is not relocated, which is onerous for the agency.
- Difficulty determining whether a business is eligible for relocation assistance services in the case of partial acquisitions. For example, a partial acquisition that affects several parking spaces can result in a loss to a business. However, determining that the loss is substantial can be very difficult in practice.
- Difficulty determining whether the occupant of a mobile home is eligible for relocation assistance services if there is a partial acquisition of a mobile home park but independent mobile homes do not have independent amenities or services (e.g., water, gas, or electricity). The criterion for determining eligibility is whether a remaining part of the property is not adequate to continue the operation of the park; however, in practice it can be difficult to make that determination.
- Difficulty determining what constitutes lawful activity for businesses in order to assess eligibility for relocation assistance services. No standard or guidance on how to make this determination is provided in 49 CFR 24. For example, in practice it may be necessary to determine whether a business activity is lawful or unlawful, or what to do if there are discrepancies between state and federal laws. Another issue is related to the location where the business activity takes place (e.g., if the activity is lawful but the business violates zoning restrictions).
- Difficulty determining whether to provide relocation assistance services to entities that conduct business at a location being acquired. For example, flea markets or hair salons may operate as independent businesses within a premises and pay rent or a commission to the property owner. They may share parts of the premises and share equipment, however, and the public might not be aware that the entities are separate businesses. Not all state DOTs believe that those entities should receive relocation assistance services.

Issues and challenges associated with policies and procedures include:

- Different agencies within a state following different interpretations of relocation assistance policies (e.g., one or more LPAs may apply policies that differ from those at the state DOT, sometimes in violation of the Uniform Act and/or federal regulations).

Strategies for improvement or optimization associated with the Uniform Act include:

- Amend the Uniform Act to include a definition for the term "unlawful occupancy" in the case of non-residential property. The act only defines unlawful occupancy in the context of residential real property.

Strategies for improvement or optimization associated with federal regulations include:

- Develop a standard and tools for determining whether a person is lawfully present in the United States. Although agencies have had success with the self-certification provisions in 49 CFR 24, collecting information from persons who are illegally present in the United States is challenging because those persons tend not to volunteer information easily and because it is difficult to verify the validity of documents such as birth certificates, permanent residency cards, visas, and passports.
- Develop a standard or procedure for determining the permanent place of residence of a displaced person. For example, agencies could request that displaced persons provide certain documents, such as the last tax return, driver's license, and house lease, and verify that the address is the same on all documents. If there are discrepancies, agencies would then require the address to be updated and matched on all the documents before the agencies provide owners with any type of relocation assistance services.
- Develop tools and guidance for determining what constitutes an exceptional and extremely unusual hardship in situations of mixed households involving a displaced person's spouse, parent, and/or child who are citizens or permanent residents in the United States.
- Develop criteria for determining relocation assistance eligibility for property owners whose center of economic activity is not located at the property to be acquired (e.g., in the case of a property owner whose business is renting property, but the business office is not located at the property being acquired).
- Develop guidance for determining whether a business is eligible to receive relocation assistance services in the case of partial acquisitions. Guidance must include examples of best practices as well as specific criteria for determination.
- Develop criteria and guidance for determining what constitutes lawful activity for businesses to assess eligibility for relocation assistance services. It would be necessary to establish different types of criteria to account for factors such as the type of business activity and the location where the business activity takes place.
- Update the regulations to ensure that relocation assistance services are provided to all the entities that conduct business within the premises of a real property being acquired (i.e., not just to the owner of the property). Alternatively, develop guidance to clarify when to provide relocation assistance services to those entities so that state DOTs can apply the same standard systematically.

Strategies for improvement or optimization associated with policies and procedures include:

- Ensure that the interpretation and application of policies within a state are consistent with the agreement that each state has with FHWA. Although these agreements can vary from state to state, the application of state policies should be consistent within the state while ensuring that these policies comply with the Uniform Act and federal regulations.

Provide Relocation Assistance Advisory (Residential)

Issues and challenges associated with the Uniform Act include:

- Difficulty complying with the law in the case of persons who are unlawfully present in the United States if not providing a certain amount of services to them would cause unwanted project delays. Providing notice of the need to move is an example of a service that, under normal circumstances, agencies would recognize as a valid relocation assistance advisory service. Failing to provide that notice can cause delays that affect the project schedule and can result in additional costs because agencies must deal with the legal ramifications and expenses of going through the eviction process. However, agencies frequently do not recognize as valid any services provided to persons who are unlawfully present in the United States, and one consequence is that agencies are unwilling to compensate contractors for providing those services.

Issues and challenges associated with federal regulations include:

- Lack of guidance in the regulations, manuals, and other documentation regarding how to describe in plain language the meaning of certain terms (e.g., replacement dwelling, comparable replacement dwelling, or displacement dwelling). This lack of guidance can cause confusion to agents and displaced persons alike, resulting in situations such as an agent suggesting that a displaced person could move to a comparable replacement dwelling that the agency is using as a reference to estimate benefits. In this example, the reaction by the displaced person is predictably negative because of the perception that the agency is imposing a specific replacement dwelling (particularly if other comparable replacement dwellings are available).
- Requiring several comparable replacement dwellings (when one comparable replacement dwelling is sufficient given local market conditions), which can extend considerably the process.

Issues and challenges associated with policies and procedures include:

- Agents not being familiar with all the available federal or state programs that may be of assistance to displaced persons. Even if the agents are familiar with those programs, they often do not have the technical expertise to assist displaced persons in completing the forms to apply for such programs.
- Logistical issues that make it difficult to comply with the regulatory requirement to provide transportation to a displaced person to inspect housing. For example, an agency might have the policy of not allowing the use of state-owned vehicles to transport persons who are not state employees. In another situation, an agent (either from the agency or working for a contractor) may need to provide transportation to a person who has one or more small children and cannot leave the children with anybody else, but the agent's vehicle does not have the necessary equipment (i.e., child safety or booster seats). Likewise, the vehicle insurance might not provide adequate coverage (e.g., private vehicles intended for private use typically are not covered for business use on a regular basis).
- Improperly trained or inexperienced agents who lack presentation and communication skills to explain key elements of the relocation assistance advisory services to displaced persons. This lack of qualifications extends to ineffectiveness in working within the transportation project schedule, particularly when a displaced person fights the relocation.
- Contracting practices that reward fast completion of assigned work without proper consideration for thoroughness and high quality. In a typical situation, payment is a function of the number of relocations completed, regardless of the complexity of the relocation assistance advisory services needed. For example, the payment for a relocation that involves a family with two elderly individuals and three disabled children living in the same dwelling may be the same as the payment for providing relocation assistance to a single person living in a studio apartment. Such a practice encourages contractors to focus on the easiest cases first to satisfy the minimum requirements specified in the contract and start receiving payments. Doing so comes at the expense of the more difficult cases, however, which the agency frequently needs to resolve later. These cases can result in additional delays because agencies are forced to restart the hiring process, and the newly selected contractor needs to spend a significant amount of time becoming familiar with the cases and developing a working relationship with the displaced persons.

Strategies for improvement or optimization associated with the Uniform Act include:

- Acknowledge that not providing a minimum level of services to persons who are unlawfully present in the United States is a problem that affects the ability of state DOTs to complete real property activities to help deliver transportation projects on time and within budget. Not being able to provide advisory services or relocation payments to persons who are unlawfully present in the United States makes the relocation process problematic and time-consuming. It prevents state DOTs from being able to allocate resources, including hiring consultants, to deal with this problem. It is critical to raise awareness by documenting case studies to ensure that stakeholders understand that this is a problem that needs to be addressed. It may also be necessary to amend the Uniform Act to enable agencies to provide those services (either as a valid relocation assistance service or explicitly as a non-relocation assistance service) and make the cost to provide those services eligible for reimbursement.

Strategies for improvement or optimization associated with federal regulations include:

- Amend regulations, manuals, and other documentation to describe in plain language the meanings of terms such as "replacement dwelling," "comparable replacement dwelling," or "displacement dwelling."
- Provide flexibility to agencies by not requiring several comparable replacement dwellings when one comparable replacement dwelling is sufficient given the local market conditions.

Strategies for improvement or optimization associated with policies and procedures include:

- Develop and deliver information packages and training so that agents become familiar with all the available federal or state programs that may be of assistance to displaced persons. It is also suggested that training include providing information about all the forms displaced persons might need to apply for such programs.
- Establish adequate insurance coverage and equipment requirements for any vehicle that the agency will use (or require contractors to use) to provide transportation to displaced persons.
- Develop training programs that emphasize both technical topics and the presentation and communication skills needed to explain key elements of the relocation assistance advisory services that are available to displaced persons.

- Implement contracting practices that emphasize both the need for production and the need for thoroughness and high quality, more specifically by recognizing that different types of relocations affect the project schedule differently and that leaving complex relocations to the end is more likely to affect the project's critical path. The payment structure and schedule should reflect these differences. To assist in this process, it is important to identify the type and complexity of potential relocation requirements early in the project development process (e.g., during the planning phase or the environmental review).

Provide Relocation Assistance Advisory (Non-Residential)

Issues and challenges associated with the Uniform Act include:

- Lack of a definition and a standard for what constitutes a suitable replacement location, causing problems for both agencies and displaced persons because of the difficulty to determine what is suitable as well as any ramifications concerning the relocation schedule. Agencies must provide current and continuing information on the availability, purchase prices, and rental costs of suitable locations. However, although agencies develop location listings, these locations frequently do not meet the requirements of businesses in relation to occupancy, zoning, or other requirements, resulting in additional delays because the businesses have to find more suitable locations. In addition, as opposed to residential moves, the Uniform Act does not require finding a suitable replacement location for businesses before the agency can issue a 90-day written notice by which time the move is required. In practice, agencies frequently issue these notices even if a suitable replacement location has not been identified.

Issues and challenges associated with federal regulations include:

- *See* Determine Relocation Assistance Eligibility.
- Difficulty for businesses to find, move into, and become established at the suitable replacement location within 90 days. Even if a suitable replacement location has been identified, physically moving and reestablishing a business at the new location can take much longer than 90 days. Both the Uniform Act and the regulations indicate that 90 days is the minimum for the advance notice. By not recognizing that different types of businesses can have widely different relocation needs and schedules, however, a common assumption in practice is that the 90-day notice is acceptable in all cases.

Issues and challenges associated with policies and procedures include:

- Agents being unfamiliar with all the available federal or state programs that may be of assistance to displaced persons or being unable to assist displaced persons in completing the forms to apply for such programs.
- Contracting practices that reward fast completion of the assigned work without proper consideration for thoroughness and high quality. For example, the payment for providing relocation assistance to a small family-owned business that does not include any type of equipment and is conducted by only one person is the same as the payment for providing relocation assistance to a factory that employs hundreds of employees. As with residential relocations, the practice of rewarding fast completion encourages contractors to focus on the easiest cases first, at the expense of the more difficult cases. The agency frequently needs to resolve more difficult cases later, which can result in additional delays because agencies are forced to restart the hiring process, and the selected contractor needs significant time to become familiar with the cases and develop a working relationship with the displaced persons.

Strategies for improvement or optimization associated with the Uniform Act include:

- Develop a definition and a standard on what constitutes a suitable replacement location, including appropriate requirements that should be met before agencies can provide a notice by when the move is required.

Strategies for improvement or optimization associated with federal regulations include:

- Recognize that different types of businesses can have widely different relocation needs and schedules. More specifically, recognize that even if a suitable replacement location has been identified, physically moving and reestablishing a business at the new location can take much longer than 90 days. The regulation should account for this possibility in relation to the duration of the advance written notice by when the move is required.
- Update regulations to ensure that relocation assistance services are provided to all the entities that conduct business within the premises of a real property being acquired (i.e., not just to the owner of the property). Alternatively, develop guidance to clarify when to provide relocation assistance services to those entities so that state DOTs can apply the standard consistently.

Strategies for improvement or optimization associated with policies and procedures include:

- Develop information packages and training so that agents can become familiar with all the available federal or state programs that may be of assistance to displaced persons, and gain familiarity with all the forms displaced persons might need to apply for such programs.
- Implement contracting practices that emphasize both the need for production and the need for thoroughness and high quality, specifically by recognizing that different types of non-residential relocations have different impacts on the project schedule and that completing simple relocations early and leaving complex relocations until later is more likely to affect the project's critical path. Performance measures and the payment structure and schedule should reflect these differences. To indicate agency expectations clearly, contract scopes should be specific, describing the expected services for different types or levels of relocation assistance required instead of simply stating, for example, that the contractor will provide relocation advisory assistance services. To assist in this process, it is important to identify the type and complexity of potential relocation requirements early in the project development process (e.g., during the planning phase or the environmental review).

Issue Relocation Payments (Residential)

Issues and challenges associated with the Uniform Act include:

- Relocation payment limits not being adequate to cover residential relocation expenses. Many state DOTs highlighted this issue during the 2011 survey and follow-up interviews. In 2012, based on recommendations from listening sessions for regulatory changes that went into effect in 2005, MAP-21 adjusted relocation payments as follows (*5*):
  - Maximum replacement housing payment for displaced property owners increased from $22,500 to $31,000.
  - Maximum rental assistance payment for displaced tenants increased from $5,250 to $7,200.
  - Authorization was included to adjust (by regulation) the amounts above to take into consideration cost of living, inflation, and other factors.

  Monitoring the implementation of these amendments over time will help to determine if the relocation payment limit issue is still valid.
- Difficulty determining compliance with the required number of days a displaced person must reside at a displaced dwelling to qualify for relocation payments. This issue also was highlighted by many state transportation officials during the 2011 survey and follow-up interviews. Before MAP-21, there were two eligibility thresholds (90 days and 180 days). In 2012, MAP-21 eliminated the 180-day threshold for property owners. The Uniform Act is silent regarding rental agreement payments in cases where a homeowner resides at a displaced dwelling for at least 90 days (prior to the initiation of negotiations) and decides to rent instead of acquiring a new property. Likewise, the act does not address what happens if the duration of residency at a displaced dwelling is less than 90 days.

Issues and challenges associated with federal regulations include:

- Lack of adequate guidance regarding eligibility for last-resort housing in the case of displaced persons who occupy a rental dwelling for less than 90 days. The regulations indicate that a displaced person who does not meet length-of-occupancy requirements could be eligible for comparable replacement rental housing under certain circumstances, and that the agency must issue such payment as a replacement housing of last resort. In practice, any number of subsequent occupants of the same rental dwelling could be eligible for a last-resort housing replacement.
- Lack of clarity regarding maximum payment limits for last-resort housing. In practice, funds at state DOTs are limited. The Uniform Act indicates that the displacing agency may exceed the maximum amounts authorized for replacement housing on a case-by-case basis in accordance with federal regulations. Some guidance on the matter is provided by 49 CFR 24, but in practice, this guidance is subject to considerable interpretation, making it difficult to identify when last-resort housing assistance is necessary or how cost-effective it is.
- Length of time required to identify and select replacement dwellings, particularly for tenants. In practice, displaced persons tend not to move to the comparable replacement dwelling that was used as a reference for determining their benefits. However, because the requirements pertaining to the availability of replacement dwellings are strict and private rental markets at some locations do not remain stable for long periods, the result is more difficulty and a longer time to identify and select comparable dwellings.

Issues and challenges associated with policies and procedures include:

- Children's inability to receive relocation payments if they experience exceptional and extremely unusual hardship because their parents are unlawfully present in the United States and, therefore, are ineligible to receive relocation

assistance services. The ability of underage children to conduct normal money or banking transactions can be limited in practice, making it more difficult for them to receive relocation payments or make informed decisions to support the relocation process.
- Adding the relocation payment to the amount paid to acquire the property as part of a single, combined real property acquisition payment can cause tax ramifications for property owners. Relocation payments are not taxable income. However, part of the amount paid to acquire the property could be taxable (e.g., if there is a capital gain). Combining both payments into a single, larger payment without providing proper documentation could result in a higher tax burden for the displaced property owner, in effect reducing the relocation payment. This risk highlights the need to monitor the implementation of the lump-sum payment demonstration program.
- Risks and unknown parameters associated with the lump-sum payment demonstration program in MAP-21. The main purpose of this initiative is to expedite the acquisition of residential property, avoid condemnation proceedings, and decrease administrative costs. Lump-sum payments include both acquisition and relocation assistance. A potential risk of not separating these two payments is that displaced property owners may be unaware of all the potential relocation risks and costs at the time the lump-sum payment is agreed on, which may result in an economic loss for that property owner. Also, the likely increase in interest by attorneys in lump-sum payment cases (because of the possibility of higher fees when the payments are combined) may result in lower net payments to displaced property owners.

Strategies for improvement or optimization associated with the Uniform Act include:

- Monitor the implementation of the amendments introduced in 2012 by MAP-21 to determine the effectiveness of the maximum replacement housing payments allowed.

Strategies for improvement or optimization associated with federal regulations include:

- Develop adequate guidance regarding eligibility for last-resort housing in the case of displaced persons who occupy a rental dwelling for less than 90 days. A strategy to discourage short-term rentals after the renter vacates the property involves using protective rental agreements by which the agency pays the owner rent and the owner agrees not to allow others to occupy the rental property.
- Broaden the comparable replacement dwelling methodology for estimating relocation payments to include state-developed schedules if sufficient comparable housing is available and multiple displaced persons exist with comparable housing requirements. For example, in California, representative dwellings (as opposed to specific dwellings) are used to calculate relocation payments. This method is particularly useful if numerous residential displaced persons on the same project have very similar requirements for comparable replacement housing. For the calculation, the relocation agent gathers as many comparable dwellings as possible and determines a mean purchase price or rent, which provides the basis for the determination of eligible price differential payments or rental assistance payments.
- Change the concept of availability required for comparable replacement dwellings. Regulations should recognize that most displaced persons do not move to the comparable replacement dwelling that was used as a reference for determining relocation payments.
- Develop a systematic process approved by FHWA to deal with negative equity situations. To date, there have only been temporary waivers of the methodology for calculating relocation housing payments in the case of negative equity situations.

Strategies for improvement or optimization associated with policies and procedures include:

- Establish reliable mechanisms to ensure that children whose parents are unlawfully present in the United States can receive and manage relocation payments. Some states issue instruments such as debit or credit cards to the children and allow their parents to use them.
- If combined acquisition and relocation payments are issued, establish a clear separation between the relocation payment and the amount paid to acquire the property to prevent the risk of the relocation payment becoming taxable income.
- Monitor the progress and results of the MAP-21 demonstration program for lump-sum payments.
- Enable electronic payments and direct deposit options to streamline relocation payments.
- Change limits to the timeframe within which displaced persons can submit claims.
- Make the use of relocation incentives a standard practice. The incentives could vary depending on the time it takes to vacate the property. For example, for property owners, the incentive could be a certain amount if the property is conveyed and vacated within 45 days, a lower amount if it is conveyed and vacated within 60 days, an even lower amount if it is conveyed and vacated within 90 days, and zero afterwards. For residential tenants, the threshold structure could be similar, except that the incentive would only cover vacating the property. An additional incentive

includes providing a payment to displaced persons so that they remain at the property until the agency acquires the property.

Issue Relocation Payments (Non-Residential)

Issues and challenges associated with the Uniform Act include:

- Insufficient relocation payment limits to cover non-residential relocation expenses. As with residential relocation payment limits, this issue was highlighted by many state DOTs during the 2011 survey and follow-up interviews. In 2012, based on recommendations from listening sessions for regulatory changes that went into effect in 2005, MAP-21 adjusted relocation payments as follows (*5*):
  - Maximum amount for fixed payment relocations increased from $20,000 to $40,000.
  - Maximum amount for actual reestablishment expenses increased from $10,000 to $25,000.
  - Authorization was included to adjust (by regulation) the amounts above to take into consideration cost of living, inflation, and other factors.

  Monitoring the implementation of these amendments over time will help to determine if the relocation payment limit issue is still valid.
- Not allowing a fixed payment option if the sole business at the displacement dwelling or site is renting the dwelling or site to others. Issuing fixed payments to non-residential property owners is typically easier and faster than reviewing, approving, and issuing actual expense payments.

Issues and challenges associated with federal regulations include:

- Difficulty determining what constitutes an eligible actual moving expense. The Uniform Act requires the determination of actual reasonable and related expenses in connection with the move, but in practice, making this determination based on the requirements in 49 CFR 24 can be challenging and time-consuming. Examples include:
  - Difficulty assessing the cost to reinstall equipment, particularly when utility upgrades are necessary at the replacement site. It is not always easy to assess whether the utility upgrade is actually necessary because of the move or an attempt to get a free upgrade with project funds.
  - Lack of guidance about how to proceed in the case of insufficient insurance to cover stolen, lost, or damaged property that was either irreplaceable or for which a monetary value was difficult to assess.
  - Lack of guidance about who is eligible for professional services for planning the move of personal property.
  - Difficulty determining the direct loss of personal property that results from moving. In most cases, the cost of moving is less than the current value of the item. Even though it can be difficult and time-consuming, however, estimating this value is required. Agencies and relocation agents often lack the expertise to conduct this assessment, and hiring subject matter experts increases the cost to complete the analysis.
  - Difficulty determining the validity of substitute personal property expenses. Although the intent of the regulation was to decrease relocation costs by selecting the less expensive option (i.e., moving existing personal property versus replacing the property with a substitute item at the replacement site), in practice this is an incentive to find a justification for discarding existing personal property and replacing it with new personal property at the replacement site.
  - The cost to search for replacement locations frequently exceeding the maximum $2,500 allowance.

Issues and challenges associated with policies and procedures include:

- Providing both fixed and non-fixed relocation payments to the same displaced person. The Uniform Act and the regulations require choosing one of the two payment options.

Strategies for improvement or optimization associated with the Uniform Act include:

- Monitor the implementation of the amendments introduced in 2012 by MAP-21 to determine the effectiveness of the maximum non-residential relocation payments allowed.
- Ensure that relocation payments are provided to all the entities that conduct business at the property being acquired (i.e., not just to the owner of the property). Alternatively, developing guidance to clarify when to provide relocation payments to those entities so that state DOTs can apply the standard systematically.

Strategies for improvement or optimization associated with federal regulations include:

- Simplify the criteria and requirements for determining actual reasonable moving and related expenses. Businesses routinely require more than the maximum allowed to search for replacement locations ($2,500) and more than the maximum allowed to complete the reestablishment process at the replacement site ($25,000). Documenting,

reviewing, and approving actual moving expenses is cumbersome and time-consuming. Strategies that simplify the criteria, requirements, and documentation associated with this process are likely to have a significant impact on nonresidential relocations. Examples include, but are not limited to, the following:

  – Use relocation estimates (particularly when the expense is likely to exceed the maximum) and/or historical payment data as an acceptable basis to document actual reasonable expenses.
  – Remove the option to purchase substitute personal property because this is not a requirement in the Uniform Act and because implementing it will address the current incentive to discard existing personal property and replace it with new personal property at the replacement site.
  – Remove the fair market value in place of the item component in the calculation for loss of tangible personal property and simply pay the amount equal to the reasonable expenses that would have been required to move such property.

Strategies for improvement or optimization associated with policies and procedures include:

- Make the use of relocation incentives a standard practice. These incentives could vary depending on the time it takes to vacate the property. For example, for business relocations, the incentive could be a certain amount if the property is conveyed and vacated within 60 days, a lower amount if it is conveyed and vacated within 90 days, and zero afterwards. For business tenants, the threshold structure would be similar, except that the incentive only covers vacating the property. Additional incentives include providing a payment to displaced persons so that they remain at the property until the agency acquires the property and using protective rent payments to property owners, particularly in the case of multi-unit dwellings, to prevent the property from being rented after the property has been vacated. Another strategy is to improve or update relocation payments for businesses to encourage businesses to reestablish locally instead of moving to other cities, states, or nations.
- Enable electronic payment and direct deposit options to streamline relocation payments.
- Establish limits to the timeframe within which displaced businesses can submit claims.
- Develop a historical database of reestablishment payments to enable estimates that are more reliable when preparing for or managing specific relocation projects. In a typical situation, the relocation agent must find suitable replacement locations available on the market and determine the eligible reestablishment expenses for those locations. Having a historical database of payments would enable agents to prepare better estimates and inform displaced persons (before the relocation process starts) about the expenses they are eligible to receive. The historical database would also facilitate the assessment of the reestablishment expenses submitted by displaced persons to ensure that the expenses are reasonable and necessary.

Property Management

Inventory and Manage Property Interests

Issues and challenges include:

- *See under* Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance:
  – Prepare Right-of-Way Map and Property Descriptions.
- Difficult-to-use databases or information systems for managing real property. At many agencies, the information system currently used for this purpose is an adaptation of the information system the agency uses to track the acquisition of real property, but this system was never envisioned or designed for long-term property asset management. Many of these systems do not include linkages to spatial databases or the ability to display CAD files or other documents associated with individual real property interests.
- Limited use of data management platforms such as CAD and GIS to support property management functions among personnel who would benefit the most from using those platforms. Issues include lack of access to CAD or GIS software licenses (e.g., if the number of contracted licenses is limited to certain workstations or individuals), and lack of familiarity or practical experience by right-of-way personnel and contractors with CAD or GIS software.
- Inappropriate file formats. Many state DOTs produce right-of-way maps in a CAD environment (e.g., MicroStation or AutoCAD), but the official plan-of-record requirement is to produce a copy in PDF, some image format (frequently of poor resolution), or paper. At many agencies, right-of-way maps still exist in old paper roll format. Further, there might not be a formal requirement to include the original CAD files as part of the permanent archive. As a result, the original CAD files are not available to support property management functions in a CAD or GIS environment effectively.
- Non-georeferenced files depicting the location of real property or files that are georeferenced but do not comply with accepted survey standards and procedures regarding positional accuracy requirements.
- Inadequate computing resources to support property management functions. Examples of problems include insufficient bandwidth to serve files, maps, and documents

efficiently; low file storage capacity; insufficient or inefficient database implementations; and inadequate or unfriendly user interfaces.
- Inadequate implementation plans that focus on short-term solutions without accounting for future planning and expansions, including how to manage the integration of old paper files into the inventory of real property, how to manage coordination and integration with other internal and external stakeholders, and funding provisions for system maintenance and upgrades to ensure the future sustainability of the system.
- Difficulty tracking authorized uses of the right-of-way such as permitted driveway and utility installations as well as unauthorized uses such as illegal encroachments.
- Inability to provide a reliable accounting of the total real property owned or managed by the agency.

Strategies for improvement or optimization include:

- *See under* Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance:
  - Prepare Right-of-Way Map and Property Descriptions.
- Develop property management systems that include user interfaces that support georeferenced information in CAD and GIS-based formats, as well as industry-standard spatial data formats such as keyhole markup language (KML), which is an official Open Geospatial Consortium (OGC) standard. A wealth of information is available in GIS format, including data sources that agencies own and manage as well as data sources managed by other agencies. However, agencies also own and manage a wealth of information in CAD format. Most CAD files are now georeferenced (with the added advantage of being produced using accepted survey standards and procedures), which makes the process of integrating this information with other spatial databases considerably easier. Effective property management would also require the capability to load and display coordinate data such as that obtained with field data collectors equipped with global positioning system (GPS) receivers, as well as supporting files such as pictures, video clips, and notes. User interfaces should also provide the capability to link to commonly used viewers such as Bing, Google Earth, and Google Street View.
- Follow a system engineering approach for the development of property management systems. Many agencies have comprehensive guidelines and procedures for the development of information technology (IT) products. Frequently, these standards are state-level standards that cover all state agencies and include elements such as planning (including stakeholder and administration buy-in), requirements analysis, design, development, testing, implementation, deployment, and decommission. Right-of-way officials and administrators should become familiar with this framework to develop implementation plans for property management systems that are feasible and have a realistic chance of succeeding.
- Develop an implementation plan that focuses both on short-term benefits and long-term expansions, including how to manage the integration of old paper files into the inventory of real property, how to manage coordination and integration with other internal and external stakeholders, and funding provisions for system maintenance and upgrades to ensure the future sustainability of the system.
- Enable mobile data access and field data entry and uploading. Mobile data access and field data collection and uploading requires investment of resources but can result in considerable savings, including instant access to spatial data, documents, and other information of interest, as well as the capability to collect data in the field and wirelessly upload the data to the agency's data servers.
- Develop robust property management system requirements as a front-end to any software acquisition or development process. Examples of critical requirements include:
  - Support for georeferenced data in a wide range of formats, including CAD, GIS, and KML.
  - Color-coding of properties on the online map display according to the property status throughout its lifetime (e.g., negotiation, condemnation, in possession, leased, sold, and so on).
  - Web-based interface that facilitates access by external stakeholders and the public to relevant real property information, including location, property descriptions, deed information, and appraisal and acquisition history. The interface should enable users to prepare a wide range of tabular and map-based queries and reports.
  - Capability to track attribute information and the status of a wide range of real property, such as parcels, mineral rights, real property access, easements, leases, and licenses. Examples of attribute information include parcel ID, project ID, area, funding source and status (particularly if the acquisition involved federal funds), and encumbrance status.
  - Integration with other systems at the agency, including project management, document management, permits, maintenance, and financial information. Integration should take place at several levels, including database levels (by using foreign keys, table relationships, and other elements) and interface levels (by enabling queries and direct data links).
  - Integration with county and/or state cadastral information systems.
  - Mobile data access and field data entry and uploading.
  - A focus on ease of data entry. Examples of requirements include linking to existing systems to facilitate the use of

drop-down menus (therefore minimizing the need for free-form text boxes), single-point data entry (to avoid having to enter data more than once), and intuitive, uncluttered user interfaces.
  - Capability to link to other agency-owned systems that track authorized uses of the right-of-way such as permitted driveway and utility installations.
  - Capability to identify, track, and handle unauthorized uses such as illegal encroachments.
  - Robust database design that focuses on table indexing, reduction or elimination of unnecessary data redundancy, and efficient data querying and reporting.
  - Adequate system design, including sufficient bandwidth to serve files, maps, and documents efficiently; adequate file storage capacity; and an efficient database implementation.
  - A focus on high quality real property data. Examples include requiring the use of standard survey-level procedures to generate parcel outlines and polygons in a CAD environment while preparing right-of-way maps, avoiding the use of informal hand-free tracing approaches to generate parcel outlines, and avoiding the use of parcel sketches that are not tied to appropriate survey controls (e.g., roadway centerlines, which can change over time). Other requirements include integrating survey and CAD software to manage parcel polygons and updating CAD design libraries to include and manage parcel polygons.
  - Multitier structure to document positional accuracy requirements and levels depending on the quality of the information available about real property.
- Establish templates for the roles and responsibilities of multiple parties that use infrastructure corridors (*10*).

Lease Property Interests

Issues and challenges include:

- *See* Inventory and Manage Property Interests.
- Difficulty determining real property that could be leased or that has a potential to generate revenue or add value to the property asset.

Strategies for improvement or optimization include:

- *See* Inventory and Manage Property Interests.
- Establish a standard protocol and lease template for utility attachments to roadway structures (*10*).
- Promote the use of agreements with LPAs to encourage the identification of locations where real property could be leased. For example, a state DOT could enter into an agreement with a city to enable the city to manage state-owned sidewalks and pedestrian areas at locations that attract businesses and tourists. The city would then lease specific sections to local businesses such as restaurants, generating revenue for both the state DOT and the city.

Dispose Property Interests

Issues and challenges include:

- *See* Inventory and Manage Property Interests.
- Difficulty determining real property that might be eligible for disposal as surplus property.
- Difficulty valuing agency-owned real property, particularly if traditional appraisal approaches yield estimates that do not reflect what the market would bear. This can be problematic if there is a requirement to sell surplus property at the appraised market value but the market is not in an appreciation trend. Attempting to sell these properties at auction would likely result in no bidders (unless the fair market value requirement can be relaxed).
- State laws and regulations requiring the approval of the state transportation commission or other governing bodies for every sale of surplus property.
- Placing indefinite holds on real property to prevent their sale without a strong business justification.

Strategies for improvement or optimization include:

- *See* Inventory and Manage Property Interests.
- Promote market-based initiatives to encourage the identification and valuation of real property that could be eligible for disposal as surplus property. Such initiatives might include:
  - Implement a web-based property management system that shows all the real property owned by the agency and enables stakeholders and the public to conduct queries by location, status, and other parameters.
  - Develop criteria and mechanisms to facilitate local analyses and valuations.
  - Depending on the type of real property, implement a system that enables online bidding by stakeholders and the public.
- Periodically review holds that prevent the sale of real property to evaluate their need and justification.
- Amend state laws and regulations that currently require the approval of the state transportation commission or other governing bodies for every sale of surplus property. A tiered structure for approvals could be established depending on the amount and location of the real property.
- Allow the addition of minor improvements to maximize the value of a real property interest.

Utility Conflict Analysis, Permits, Relocation, and Reimbursement

Provide Planning and Utility Process Linkages

Issues and challenges include:

- Not involving right-of-way personnel in planning and programming, or underestimating the importance of involving right-of-way staff in planning and project scoping.
- Lack of interest by utility owners in early participation in the project development process. Lack of interest prevents the agency from getting potentially valuable information about major facilities that might conflict with the project. From a utility owner's perspective, it is not cost-effective to spend time and resources on a project that still has too many uncertainties, particularly if the associated expenses are not reimbursable.

Strategies for improvement or optimization include:

- Ensure that right-of-way personnel are consistently engaged as part of the team performing project scoping and cost estimating. Legal personnel experienced in utility relocations should also be involved, particularly if complex utility relocations are anticipated.
- Develop a systematic procedure to update utility cost estimates throughout the project development process with an explicit methodology that includes variable contingency levels, depending on the design status.

Conduct Coordination Meetings

Issues and challenges include:

- Not involving right-of-way personnel in planning and programming, or underestimating the importance of involving right-of-way staff in planning and project scoping.
- Lack of utility owners' interest in early participation in the project development process.

Strategies for improvement or optimization include:

- Ensure that right-of-way personnel are consistently engaged as part of the team performing project scoping and cost estimating.
- Make sure right-of-way personnel are invited to participate in district and division level meetings with utility owners.

Prepare and Execute Utility Agreements

Issues and challenges include:

- Complexity of the utility cost estimation and reimbursement process. Preparing and submitting utility cost estimates demands significant time and effort from utility owners. Federal regulations designate the method of work, either force account or contract, and the method for developing utility relocation costs, preferably based on actual direct and related indirect costs. The regulations also clarify that federal funds may participate in amounts actually paid for utility relocations. Although quantities and unit costs are acceptable, utility owners typically have to prepare cost estimates broken down into cost categories such as materials and supplies, labor, transportation, equipment, and overhead, as well as account for salvage, credits, and betterments.
- Imbalance between the requirement to submit preliminary cost estimates and the recognition that federal funds may participate in amounts actually paid for utility relocations. Utility owners know this, which causes them to question why they need to spend so much time and effort developing estimates because, in the end, the agency will have to reimburse them for the actual cost to relocate their eligible facilities.
- Delays due to frequent changes in the project design. Some utility owners have to submit supplemental agreements every time there is a change in work characteristics. In addition, delays in the approval of supplemental agreements cause utility contractors to stop for several weeks, which translates to additional delays and extra costs.

Strategies for improvement or optimization include:

- Streamline and standardize utility cost data submissions. Standardization of utility cost estimation procedures benefits both agency and utility owners. In particular, standardized procedures enable the agency to compare cost estimates across districts.
- Develop a systematic procedure to update utility cost estimates throughout the project development and delivery process with an explicit methodology that includes variable contingency levels, depending on the design status.
- Include utility relocations in the highway contract. If feasible, this strategy can give utility owners more time to plan for the relocation and ensure that utility relocations only take place if a project actually moves to a construction phase. The state DOT can also reduce or avoid contractor delay claims more effectively because the contractor is responsible for the relocations.
- Develop web-based systems to automate the preparation of utility cost estimates and the submission of utility agreement forms and supporting documentation.

Monitor Utility Relocations and Reimburse Utility Owners

Issues and challenges include:

- Requirement to justify discrepancies in the final bill, particularly when the total relocation cost is lower than the

original estimate by more than a certain amount or percentage. Particularly for projects that run under budget, utility owners find this requirement cumbersome and unnecessary.
- Compressed project development schedules at state DOTs that affect the utility coordination process, which affects the time that utility owners have for relocation. Challenges in completing the acquisition of real property before utility owners start developing utility relocation projects further complicate the relocation process. There are cases when acquisition of real property extends into construction. This hampers utility owners' ability to develop relocation projects because of the uncertainty of available right-of-way and potential environmental issues, such as aquifers and endangered species.
- Late submission of billings by utility owners. In practice, situations often arise in which a utility owner submits billings years after the relocation has been completed. In some cases, utility owners do not submit final billings at all. Such delays in submitting billings are a source of delay and inefficiency at state DOTs because of the additional time and effort needed to track the missing or late billings and the inability to close projects properly.

Strategies for improvement or optimization include:

- Notify utility owners about project schedule changes as soon as possible to enable those utility owners to reallocate resources and minimize unnecessary expenditures.
- For non-reimbursable utility relocations, promote the use of financial incentives that are tied to pre-established utility relocation milestones that have been agreed upon through coordination between the agency and the utility owner. Failure of the utility owner to meet milestones would cause the utility to forfeit all or a pre-established percentage of the incentive compensation, in effect causing the utility owner to relocate its facilities at its own expense.

Project Management

Establish Project Management Team

Issues and challenges include:

- Not involving or underestimating the importance of involving right-of-way, legal, environmental, construction, and maintenance personnel in the project management team. This issue is particularly critical if the need to involve these personnel may not be readily apparent to project managers (e.g., for meeting federal and state accessibility requirements, identifying real property requirements and challenges to support environmental commitments, and identifying potentially challenging locations from a real property acquisition and relocation assistance perspective).

Strategies for improvement or optimization include:

- Ensure that right-of-way, legal, environmental, construction, and maintenance personnel are engaged in establishing the project management team.
- Seek executive-level commitment for early engagement of right-of-way staff in the project management team and be willing to raise concerns proactively to executive management if this early engagement is not occurring on projects.

Manage Project Development and Delivery Process

Issues and challenges include:

- Performance measures that focus on the duration to acquire real property without taking into consideration issues such as the degree to which right-of-way personnel were properly involved in earlier project development phases and the degree to which right-of-way personnel were involved in determining project schedules. Other issues that affect the feasibility or robustness of time-based performance measures include staff shortages and turnover and the availability and effectiveness of training and other professional development opportunities.
- Focusing on streamlining and accelerating project delivery at the expense of property rights and the right to due process.

Strategies for improvement or optimization include:

- Use standardized forms that include real property components to develop transportation project scopes that facilitate the development of preliminary cost estimates and schedules. The real property components should include both real property acquisition and an assessment of potential relocation assistance impacts and requirements. It is worth noting that NCHRP Project 08-88 is conducting an assessment of scoping practices around the country, including a review of forms used by different state DOTs, and will develop a suggested framework for developing project scopes.
- Develop performance measures and program data collection plans that focus on collecting meaningful information about the effectiveness of the property acquisition and property management functions. Examples of performance measures include:
  - Number of real property interests at critical milestones (e.g., approved for acquisition, acquired by negotiation, acquired by mediation, acquired by condemnation proceedings, in possession, and acquired or in possession prior to letting).

  - Number of residential displaced persons and number of persons who are ineligible for relocation assistance services (including the reasons they are ineligible).
  - Number of non-residential displaced persons by major categories (e.g., property owners, tenants, type and size of business, and relocation needs and requirements).
  - Time to complete critical real property activities in relation to major transportation project milestones such as development of planning-level project scopes and cost estimates, approval of the environmental document, approval to acquire property, completion of the design phase, letting, and beginning of construction, and more.
  - Cost estimates, budgets, and expenditures in real property acquisition and relocation assistance services at critical transportation project milestones, from planning to construction. Cost estimates, budgets, and expenditures should include direct costs as well as project management, legal support services, and administrative support costs. For a proper evaluation of expenditures, dollar amounts should include a category to measure the cost to the state to acquire real property through condemnation.
  - Quality of real property deliverables at critical milestones. Measuring the quality of real property deliverables should include both internal measures (i.e., measures provided by agency personnel) and external measures (i.e., measures provided through surveys of property owners and tenants on the quality of the service provided by agency personnel and contractors during the real property acquisition and relocation phase).
  - Number of surplus property interests at different stages (e.g., identified, approved for sale, leased, and sold).
  - Time to complete critical property management activities.
  - Costs incurred and revenue generated from property leases and sales.
  - Quality of property management services provided using both internal measures (i.e., measures provided by agency personnel) and external measures (i.e., measures provided through surveys of property owners and tenants on the quality of the services provided by the agency).
  - Number of training opportunities offered and received, categorized by topic and staff training needs and requirements.
  - Link between training opportunities and career advancement within the agency.
  - Budget allocated to right-of-way staff training and professional development.
  - Staff turnover rate.
- Use statistical techniques (including central tendency and dispersion measures) to track the duration and resources used for the completion of critical milestones. One use of this information is to enable the agency to adjust the duration of certain activities based on real project data (e.g., the number of days needed to provide property owners to review offers). The agency could also use this information for scheduling purposes and for allocating funds and resources.
- Incorporate risk management techniques into the property acquisition and relocation functions by explicitly considering elements such as vulnerabilities, risk levels, and mitigation strategies to address those risks. This analysis could be used to provide more realistic estimates of durations and costs with an explicit risk-based representation of contingencies that vary along the project development process as more accurate information becomes available.

Other Issues and Strategies for Improvement or Optimization

Program Management and Administration

Issues and challenges include:

- *See under* Project Management:
  - Manage Project Development and Delivery Process.
- Institutional structures that do not encourage the transition to electronic document management practices and keep requiring paper copies of most real property acquisition and relocation documents.

Strategies for improvement or optimization include:

- *See under* Project Management:
  - Manage Project Development and Delivery Process.
- Decentralize signing authority, approval, and acceptance of acquisition documents by moving more approval authority to the local level.
- Work with LPAs to pursue corridor management and corridor preservation strategies. The basis for the application of these strategies includes municipal comprehensive plans, municipal and county transportation plans, regional transportation plans, municipal and county subdivision regulations, and local zoning and development regulations. The greatest opportunity to undertake these initiatives is at the local level with adopted comprehensive plans and zoning. The reason is that LPAs have the ability to regulate subdivision of property, land use density, and other aspects of site development along highway corridors. Most of the tools needed for corridor management and corridor preservation are contained within local subdivision regulations and zoning ordinances, which are the two key tools that cities use to implement their comprehensive

plans. Local plans may also contain specific components, policies, or objectives on corridor management and corridor preservation, including prioritization of corridors within the community for corridor management and/or corridor preservation programs.

Staffing and Training

Issues and challenges include:

- Difficulty hiring and retaining staff with adequate real property acquisition experience.
- Too many silos because of the level of specialization within the staff, resulting in too many hand-offs and limited succession planning.
- Lack of recognition of required real property skill sets within the agency and lack of career paths and promotion opportunities within the engineering-centric culture typically found at state DOTs.
- Inadequate funding for training and professional development opportunities for right-of-way personnel, along with the related issue of availability of training only in certain areas (e.g., appraisals) but not in other critical right-of-way functions.
- LPAs not having the required skills or knowledge to understand and implement regulations due to inexperience and understaffing.
- Out-of-state trainers who are not familiar with the laws, regulations, and procedures of the state where they are conducting training.

Strategies for improvement or optimization include:

- Market and champion the importance of right-of-way as a discipline within the state DOT structure, including the development of information outreach programs within the agency promoting the right-of-way profession as a career path and implementing more equitable pay levels to attract more qualified right-of-way professionals and support staff.
- Encourage professional development by providing reimbursement for courses and other training opportunities offered through universities, community colleges, IRWA, and AASHTO, and by linking these training opportunities to career advancement within the organization.
- Promote the development of cost-effective, highly interactive online training opportunities, while continuing to offer traditional classroom courses for advanced topics.
- Provide training in topical areas that are critical but frequently not emphasized (e.g., local culture, policies, and customs; local market conditions and the use of local, up-to-date data; necessary communication skills to develop rapport with property owners quickly and effectively; and conflict resolution techniques). Training should also focus on technical areas such as CAD, GIS, and other geospatial technologies.
- Provide cross-training opportunities within the agency to allow for more flexibility and reduce delays due to unnecessary dependence on a reduced number of right-of-way personnel within the agency. Cross-training should include providing headquarters or regional staff with the opportunity to work on projects across regions and to go to other regions to provide training and mentoring. It should also include conducting meetings with officials from other districts or regions on a regular basis to learn from each other and to ensure consistency of practices throughout the state.
- Train and allocate adequate clerical support to complete paperwork and forms in support of right-of-way personnel. Doing this will help to leverage the time of experienced right-of-way professionals and result in fewer errors, corrections, and iterations between district and central offices.
- Develop partnerships with universities and community colleges to develop and conduct training in real property topic applications in transportation. This strategy also includes working with engineering schools to expand their transportation curriculum to include courses or programs on real property acquisition and management and integration of these processes within the project development and delivery process.
- Develop partnerships with contractors to develop cross-training opportunities and to help with the retention of institutional knowledge in both the public and private sectors.

Outsourcing

Issues and challenges include:

- *See under* Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance:
  - Prepare Right-of-Way Map and Property Descriptions.
  - Conduct Appraisal or Waiver Valuation.
  - Acquire by Negotiation.
  - Provide Relocation Assistance Advisory (Residential).
  - Provide Relocation Assistance Advisory (Non-Residential).
- Lack of an adequate mechanism to evaluate contractors. Some state agencies do not evaluate the performance of contractors who have performed work for the agency in the past. Other agencies conduct evaluations during or at the end of the contract but do not use the evaluation results as a selection criterion for future procurements, rendering the evaluation process less meaningful. In other situations, different officials within the same agency may have different perspectives on the performance of the same

contractor, but the agency lacks a systematic approach to consolidate these different views. As a result, a contractor may be hired based on a positive prior performance in one district even though there may be negative reviews for the same contractor from other districts within the same agency.
- Initial proposals that appear to be competitive but, following the contract award, encounter contract modifications that drive costs up significantly due to revisions, scheduling, and other factors. The final cost of outsourcing is actually higher (and could end up being more expensive than conducting the work in-house) after taking into account the time and resources needed to oversee the contracts and review and make corrections to the contractor's deliverables.
- Contractors having performance problems when handling an entire real property acquisition project. Outsourcing right-of-way functions seems to be more effective for handling specific functions or handling high-peak workloads. Contractors may be hired who have expertise in some right-of-way functions but little or no expertise in other areas. Evaluations of contractors' proposals may not account properly for these variations and potential deficiencies in expertise. Moreover, agencies may use the same contract structure for the entire real property acquisition project as for handling individual project components without including specific provisions for handling the significantly higher risks and uncertainties associated with the entire project.
- LPA contractors not having enough expertise, cutting corners, or not following federal or state laws or regulations and/or established policies and procedures.

Strategies for improvement or optimization include:

- *See under* Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance:
  - Prepare Right-of-Way Map and Property Descriptions.
  - Conduct Appraisal or Waiver Valuation.
  - Acquire by Negotiation.
  - Provide Relocation Assistance Advisory (Residential).
  - Provide Relocation Assistance Advisory (Non-Residential).
- When selecting contractors, review and approve the resumes of every single individual, and include a provision to approve or deny any new hires. An in-depth knowledge of the firms and their staff enables the agency to select the right firm for a particular job. It is also critical to use the evaluation results from previous projects as a selection criterion for future procurements.
- Develop contract templates that include precise requirements for robust scopes of work, identification of specific deliverables and the expected completeness and quality, and payment schedules that are linked to the submission of quality deliverables. Depending on the need, it could be critical to develop templates for a variety of contracting requirements ranging from specific right-of-way functions to complete projects, including specific provisions to handle risk and uncertainty for each type of contract.
- Use pre-approved lists of on-call contractors, which reduces the need for more frequent contractor bidding and selection cycles. As projects come up, the agency chooses contractors from the pre-approved list through a mini-bid process. This strategy enables the agency to be flexible in responding to variations in project demands.
- Work with or require LPAs to hire contractors from the list of pre-approved contractors that the state DOT uses.

Summary

This chapter summarized issues and challenges affecting transportation project development and delivery process activities that typically have a major real property component. It also identified various strategies for improvement or optimization to address those issues and challenges. Table 13 summarizes the issues, challenges, and strategies that were identified during the research. In total, the research team identified 174 issues and challenges and identified 195 strategies for improvement or optimization. The list in Table 13 is organized as follows:

- Project development and delivery process activities with a significant real property component (42 activities, as shown in Chapter 3, Figure 11)—161 issues and challenges, 179 strategies:
  - Definition, selection, financing, and scheduling (2 activities).
  - Alternative analysis and preliminary analysis (4 activities).
  - Environmental process (4 activities).
  - Design and PS&E assembly (6 activities).
  - Right-of-way map, authorization to acquire property, property acquisition, and relocation assistance (17 activities).
  - Property management (3 activities).
  - Utility conflict analysis, permits, relocation, and reimbursement (4 activities).
  - Project management (2 activities).
- Other—13 issues and challenges, 16 strategies:
  - Program management and administration.
  - Staffing and training.
  - Outsourcing.

The number of *unique* issues, challenges, and strategies is lower than the total number of listed issues and challenges because some issues, challenges, or strategies are mentioned

Table 13. Issues, challenges, and strategies for improvement or optimization.

Project Development and Delivery Process Activity with a Significant Real Property Component	No. of Issues Identified			No. of Strategies Identified		
DEFINITION, SELECTION, FINANCING, AND SCHEDULING	**14**			**15**		
Prepare Cost Estimate and Identify Funding Sources	6			12		
Secure Federal, State, and Local Agreements	8			3		
ALTERNATIVE ANALYSIS AND PRELIMINARY PLANS	**7**			**8**		
Conduct Conceptual Design Meeting	2			2		
Collect Data for Preliminary Design	1			2		
Obtain Permission to Enter Property	3			2		
Conduct Value Engineering Study	1			2		
ENVIRONMENTAL PROCESS	**7**			**14**		
Prepare Draft Environmental Documentation	1			5		
Conduct Public Meetings	2			4		
Meet Environmental Commitments After Clearance	2			3		
Conduct Environmental Reevaluation	2			2		
DESIGN AND PS&E ASSEMBLY	**11**			**12**		
Conduct Design Meeting	2			5		
Develop Final Horizontal and Vertical Alignments	3			1		
Conduct Detailed Design	2			1		
Conduct 30%, 60%, and 90% Design Meetings	1			1		
Prepare PS&E Package	1			2		
Conduct Final Design and Initial Construction Coordination Meetings	2			2		
RIGHT-OF-WAY MAP, AUTHORIZATION TO ACQUIRE PROPERTY, PROPERTY ACQUISITION, AND RELOCATION ASSISTANCE	**93**			**99**		
Provide Planning and Real Property Acquisition Linkages	1			1		
Conduct Real Property Research	2			5		
Coordinate with Other Stakeholders	6			5		
Prepare Right-of-Way Map and Property Descriptions	7			4		
Obtain Authorization to Acquire Real Property	2			2		
Conduct Appraisal or Waiver Valuation[1]	1[a]	2[b]	11[c]	1[a]	2[b]	10[c]
Establish Just Compensation[1]			1			2
Prepare and Make Written Offer[1]		2	1	1	2	2
Acquire by Negotiation[1]	1	1	11	1	2	12
Acquire by Condemnation[1]			7			5
Demolish and Dispose Improvements[1]			2			2
Prepare Right-of-Way Certification[1]			1			1
Determine Relocation Assistance Eligibility[1]	1	8	1	1	7	1
Provide Relocation Assistance Advisory (Residential)[1]	1	2	4	1	2	4
Provide Relocation Assistance Advisory (Non-Residential)[1]	1	2	2	1	2	2
Issue Relocation Payments (Residential)[1]	2	3	3	1	4	6
Issue Relocation Payments (Non-Residential)[1]	2	1	1	2	1	4

[1] For activities explicitly accounted for in the Uniform Act, from appraisals to relocation payments, the issues, challenges, and strategies are disaggregated according to the following categories:
[a] Uniform Act.
[b] Federal regulations.
[c] Policies and procedures.
[2] Not a specific project development and delivery process activity.

Table 13. (Continued).

Project Development and Delivery Process Activity with a Significant Real Property Component	No. of Issues Identified	No. of Strategies Identified
PROPERTY MANAGEMENT	**16**	**15**
Inventory and Manage Property Interests	9	7
Lease Property Interests	2	3
Dispose of Property Interests	5	5
UTILITY CONFLICT ANALYSIS, PERMITS, RELOCATION, AND REIMBURSEMENT	**10**	**10**
Provide Planning and Utility Process Linkages	2	2
Conduct Coordination Meetings	2	2
Prepare and Execute Utility Agreements	3	4
Monitor Utility Relocations and Reimburse Utility Owners	3	2
PROJECT MANAGEMENT	**3**	**6**
Establish Project Management Team	1	2
Manage Project Development and Delivery Process	2	4
OTHER[2]	**13**	**16**
Program Management and Administration[2]	2	3
Staffing and Training[2]	6	8
Outsourcing[2]	5	5

in connection with more than one activity. In total, the research team identified 153 unique issues and challenges and 176 unique strategies for improvement or optimization.

Most strategies listed in Table 13 are process-related strategies that state DOTs could implement without the need for changes in laws or regulations. For completeness, Table 13 also connects 75 issues and challenges and 82 strategies with activities (from appraisals to relocation payments) that are explicitly accounted for in the Uniform Act. For these activities, the issues, challenges, and strategies are disaggregated according to the following categories:

- Uniform Act—9 issues and challenges, 9 strategies.
- Federal regulations—21 issues and challenges, 22 strategies.
- Policies and procedures—45 issues and challenges, 51 strategies.

CHAPTER 6

Conclusions and Suggestions

Conclusions

The purpose of NCHRP Project 20-84 was to (a) develop improved, integrated real property procedures and business practices in the project development and delivery process; and (b) develop suggestions to improve property management practices. Of particular interest was comparing typical business practices against the requirements in the Uniform Act (as codified in 42 U.S.C. 4601 et seq.), but without regulatory encumbrances. The goal of this analysis was to determine which business process elements were critical to the mission of the real property function according to federal law requirements (and identify strategies to improve or optimize those elements), and which business process elements were not critical and, therefore, could be improved or removed.

Online Survey, Follow-Up Interviews, and Peer Exchange

The research team conducted an online survey, follow-up interviews, and a peer exchange to (a) assess real property acquisition and property management practices around the country and (b) gather ideas on issues, challenges, and best practices. A comprehensive literature review of prior studies and initiatives complemented this information-gathering exercise. The online survey included two versions of the survey instrument, one for state DOT officials and one for consultants. The follow-up interviews and the peer exchange complemented the online survey to clarify some of the responses and to seek additional information with respect to specific issues, strategies, and potential suggestions. Major highlights from these activities include:

- **Issues, challenges, and business practices.** The highest-impact challenges that state DOTs face when acquiring real property for transportation projects arise from changes to real property acquisition needs late in the design phase and a lack of involvement of right-of-way staff during design. Not involving right-of-way personnel in earlier phases (planning and programming, preliminary design, and the environmental process) and during utility coordination also causes major problems. Survey respondents also pointed to critical staffing issues, including difficulty to hire and retain staff with adequate real property acquisition experience and staff turnover.
- **Outsourcing real property activities.** In general, state DOTs value using consultants when the internal workload is heavy and the DOT does not have the resources to accommodate the demand. However, feedback from state DOTs indicates there are serious issues. Examples of issues include the quality of deliverables, quality of customer service, and amount of management required. Other issues include higher overall costs to the state DOT and higher condemnation rates.
- **Performance measures.** State DOTs use and need a variety of performance measures in connection with the acquisition of real property for transportation projects. Although most participants agreed about the need to measure the effectiveness of the real property acquisition process, several participants cautioned against using performance measures blindly in the context of a process that involves taking private property for the benefit of a transportation project.
- **Changes to laws and regulations.** Only a few participants indicated that there was an urgent need for changes to laws and regulations (whether federal or state). Nonetheless, participants highlighted the need for some changes (e.g., in relation to appraisal waiver limits, relocation benefits for businesses, and timelines related to condemnation proceedings).
- **Business practices, unique processes, and strategies.** Participants provided substantial feedback regarding business practices, unique processes, and strategies their agencies have implemented, or are planning to implement, to streamline real property processes. For example, participants

highlighted the need to improve internal coordination within their agencies, particularly with respect to the timing for involvement of right-of-way personnel. Participants also highlighted the need for more effective coordination with external stakeholders (e.g., federal agencies, railroad companies, and utility owners). Several ideas involved raising the limit on appraisal waivers or evaluating situations that involve low-impact business risks. Other ideas involved raising the limit for relocation payments (primarily for businesses) and using incentives to encourage more effective participation by property owners.

- **Training.** State DOTs provide two types of training and development opportunities (in-house and external) in addition to on-the-job training and mentoring. Some of the courses are state-certified or pre-approved for continuing education credits for real estate and appraisal licensing. Some agencies have agreements with colleges in their state that offer courses on real property topics. Participants highlighted that training opportunities have decreased substantially in recent years because of budgetary constraints.
- **Property management.** Agencies use a variety of data management platforms for property management purposes. Although databases and web-based mapping tools are increasingly used, CAD or GIS platforms are not used frequently to support property management activities. The highest-impact issue reported by participants related to difficult-to-use databases or information systems to manage real property assets. Difficulty in tracking and monitoring real property uses was also highlighted as having a significant impact, including how to deal with illegal or unauthorized encroachments.

Integrated Transportation Project Development and Delivery Process Modeling

The research team conducted a review of practices around the country to identify existing project development and delivery workflows, and developed a reference integrated model of the transportation project development and delivery process that takes into account real property acquisition workflows and requirements. For completeness, the research team developed three versions of the project development and delivery process, as follows:

- **Level 1.** This high-level depiction of the entire process, shown in Chapter 3, Figure 10, considers both phases and functional areas, including real property acquisition and property management.
- **Level 2.** This intermediate-level depiction of the entire transportation project development and delivery process is shown in Chapter 3, Figure 11.
- **Level 3.** This detailed depiction of the real property acquisition process according to the Uniform Act, as codified in 42 U.S.C. 4601 et seq., is shown in Figure 23.

These models are provided as a project deliverable in Microsoft Visio 2010 format and PDF.

Developing the reference (or unencumbered) real property acquisition and relocation assistance model involved analyzing each provision in the three subchapters of 42 U.S.C. 4601 et seq. and mapping each provision to its corresponding location on the transportation project development and delivery process, i.e., taking into consideration functional areas and interdependencies. This process was challenging because the Uniform Act does not follow a sequential or chronological order of activities. However, it was critical to complete this activity to identify critical paths and opportunities for improvement or optimization of the process. For completeness, the research team also developed a mapping between Uniform Act and federal regulation provisions.

A review of Uniform Act provisions in relation to the overall project development and delivery process and actual practice highlighted a few major areas that the act does not address or cover. Some of these areas are as follows:

- Interaction between the project development and delivery process and the real property development and delivery process, including location(s) along the project development process where real property acquisition activities could or must start.
- Encouragement of beginning real property activities (other than relocation) earlier in the process.
- Appraisal standards and scope of work.
- Situations in which LPAs acquire property.
- Business ownership of properties being acquired.
- Updating of offers of just compensation.
- Situations involving the unit rule concept in relation to the various physical components of real estate.
- Handling of mobile homes and outdoor advertising signs (particularly off-premises signs), as real or personal property. In the case of outdoor advertising signs, a common issue is how to separate the acquisition of the sign itself from the acquisition of the leasehold interest of the sign company, which pertains to the specific sign location, not to the entire company.
- Mediation before condemnation proceedings.

Reference Real Property Acquisition and Relocation Assistance Work Schedule

The research team developed a reference work schedule that incorporates Uniform Act requirements and procedures into the reference (or typical) transportation project and

delivery process. The work schedule includes tasks that represent Level 2 model swim lanes and activities as well as Level 3 model activities. The reference work schedule was developed in Microsoft Project 2010. Files for the reference work schedule are provided on CRP-CD 154 in Project format and PDF.

The reference work schedule could be used for a variety of applications. Examples include, but are not limited to, assigning resources to tasks, managing project budgets, analyzing workloads, facilitating coordination with internal and external stakeholders, adjusting schedules, monitoring project progress, and preparing reports. Agencies could also use the work schedule to train internal and external stakeholders on project development and delivery process interdependencies and Uniform Act requirements.

Every project is different, which has an impact on individual task durations. In practice, agencies tend to assume predictable durations for real property acquisition activities (e.g., 18–24 months between appraisals and letting). Agencies also use simple static Gantt charts to document and schedule real property activities. However, using scheduling software tools to conduct what-if scenarios to understand and anticipate the impact of activity changes in the overall schedule and the critical path of the real property process is not common. Also not common is the use of statistical methods to derive central tendency and dispersion estimators of right-of-way activity durations. However, developing this capability is critical to understanding uncertainties and risks, particularly in situations that can affect not just the acquisition of real property but also the entire project (e.g., when an acquisition goes to condemnation proceedings). One reason is that, as the duration to acquire real property increases, the level of uncertainty (and therefore the risk to the project) also increases.

Strategies for Improvement or Optimization

The research team analyzed key elements of the state project development and delivery process to identify opportunities for a more effective integration of real property-related activities with the rest of the process. The analysis focused on process activities with a significant real property component, with a goal of identifying issues and challenges as well as strategies for improvement or optimization to address those issues and challenges. To ensure that the analysis was manageable, the research team focused only on process activities with a significant real property component.

The list of issues, challenges, and strategies was based on responses that stakeholders provided during the surveys and interviews, as well as on lessons learned from previous studies or from experience. In Chapter 5, Table 13 summarized the issues, challenges, and strategies that were identified during the research. In total, the research team identified 174 issues and challenges and 195 strategies for improvement or optimization. In total, the research team identified 153 unique issues and challenges and 176 unique strategies for improvement or optimization. Of these 176 strategies, more than 140 are process-related strategies that state DOTs could implement without the need for changes in laws or regulations. Chapter 5 provided a detailed description of each strategy. A very small sample of process-related strategies follows, organized into policies and procedures, contracting practices, and use of advanced technologies:

- Suggested changes to agency policies and procedures:
  - Modify state DOT project development manuals and guidelines to specifically require the involvement of right-of-way personnel in the planning, scoping, and environmental phases and the early stages of the design phase.
  - Enforce CAD protocols and standards strictly to ensure the quality and completeness of right-of-way maps.
  - Enforce the requirement that every parcel be properly documented using accepted survey standards and procedures, including the identification of parent tracks, taking areas, and remainder areas, as well as the integrated calculation of those areas.
  - Implement a protocol for updating appraisals in areas or situations where market values tend to change rapidly. The protocol would address cases where a complete reappraisal is necessary and cases where an expedited appraisal or waiver valuation might be sufficient.
  - Develop a multitier approach to enable districts, not only the central office, to establish just compensation for acquisitions below a certain threshold.
  - Separate incentives from the amount believed to be just compensation.
  - Require presentation of the appraisal at the time of the offer.
  - Develop a multitier approach for assigning and conducting negotiations.
- Suggested changes in contracting procedures:
  - Utilize best value selection processes for appraisers and right-of-way consultants.
  - Utilize master contracts completed on an annual or other periodic basis with task orders for specific projects issued off the master contracts to reduce the lead time needed to acquire consultant staff for a specific project.
  - Incorporate performance goals into consultant contracts and utilize past performance against these standards for future consultant selections.
- Utilization of advanced technologies:
  - Implement web-based database management systems to manage the real property acquisition process.

  - Implement database management systems that utilize CAD and GIS technologies to support property management functions.
  - Utilize visualization techniques to communicate with property owners effectively about the scope of the project and the proposed real property acquisitions needed to support the project.
  - Utilize Internet-based tools to transmit offers and other required documents to property owners electronically.

Table 13 also shows the issues and strategies in connection with activities that are explicitly accounted for in the Uniform Act, from appraisals to relocation payments (in total, 75 issues and challenges, as well as 82 strategies). For these activities, the issues, challenges, and strategies are disaggregated according to the following categories:

- Uniform Act—nine issues and challenges, nine strategies.
- Federal regulations—21 issues and challenges, 22 strategies.
- Policies and procedures—45 issues and challenges, 51 strategies.

Strategies that involve potential changes to the Uniform Act include the following:

- Introduce and define the concept of uncomplicated real property, and specify a regulatory procedure to distinguish between uncomplicated and complicated real property for identifying when a waiver valuation is acceptable.
- Include a definition for the term "unlawful occupancy" in the case of non-residential property. The act only defines unlawful occupancy in the context of residential real property.
- Enable the use of electronic communications to make the offer, including email and web-based protocols.
- Enable agencies to provide a minimum level of services to persons who are unlawfully present in the United States because of the recognition that not doing so affects the ability of state DOTs to complete real property activities to help deliver transportation projects on time and within budget.
- Develop a definition and a standard for what constitutes a suitable replacement location, including appropriate requirements that should be met before agencies can provide a notice by when the move is required.

The remaining strategies related to the Uniform Act involve monitoring the implementation of MAP-21.

Similarly, strategies that involve potential changes to federal regulations include the following:

- Establish a tiered approach for determining when it is necessary to conduct appraisals and appraisal reviews.
- Require, not simply suggest, that agencies provide property owners with enough time to review an offer.
- Provide property owners with a clear statement (along with the written offer) setting up the maximum duration for negotiations and the conditions under which an agency can extend this period.
- Develop standards and tools for determining whether a person is lawfully present in the United States.
- Develop a standard or procedure for determining the permanent place of residence of a displaced person.
- Develop tools and guidance for determining what constitutes an exceptional and extremely unusual hardship in situations of mixed households that involve individuals who are the displaced person's spouse, parent, or child and who are citizens or permanent residents in the United States.
- Implement a streamlined process for low-cost temporary easements.
- Make the use of possession-and-use agreements a standard practice.
- Develop guidance for determining whether a business is eligible to receive relocation assistance services in the case of partial acquisitions.
- Develop criteria and guidance for determining what constitutes lawful activity for businesses to assess eligibility for relocation assistance services.
- Ensure that relocation assistance services are provided to all the entities that conduct business within the premises of a real property being acquired. Alternatively, develop guidance to clarify when to provide relocation assistance services to those entities so that state DOTs can apply the same standard systematically.
- Describe in plain language the meaning of certain terms (e.g., "replacement dwelling," "comparable replacement dwelling," or "displacement dwelling").
- Provide flexibility by not requiring several comparable replacement dwellings when one comparable replacement dwelling is sufficient given the local market conditions.
- Recognize that different types of businesses can have widely different relocation needs and schedules.
- Develop adequate guidance regarding eligibility for last-resort housing in the case of displaced persons who occupy a rental dwelling for less than 90 days.
- Develop criteria for determining relocation assistance eligibility for property owners whose center of economic activity is not located at the property to be acquired.
- Broaden the comparable replacement dwelling methodology for estimating relocation payments to include state-developed schedules in cases where sufficient comparable housing is available and there are multiple displaced persons with the same comparable housing requirements.
- Change the concept of availability required for comparable replacement dwellings.

- Develop a systematic process to deal with negative equity situations.
- Simplify the criteria and requirements for determining actual reasonable moving and related expenses because of the recognition that businesses routinely require more than the maximum allowed to search for replacement locations or complete the reestablishment process at the replacement site.

In summary, NCHRP Project 20-84 produced the following results:

- An integrated model of the transportation project development and delivery process, a real property acquisition and relocation assistance model in accordance with 42 U.S.C. 4601 et seq., and a standalone version of the integrated process model (as provided in CRP-CD 154).
- A reference real property acquisition and relocation assistance work schedule. A standalone version of the reference work schedule also was developed and included on CRP-CD 154.
- A detailed list of improvement or optimization strategies to address issues and challenges that affect project development and delivery process activities with significant real property components.

Suggestions

Implementing the results of this study nationwide will likely yield benefits such as the following:

- A streamlined real property acquisition and relocation assistance business process that facilitates data exchange and encourages communication and coordination among stakeholders, including stakeholders within the same agency.
- Improvements in efficiency and reduction of redundancy in real property activities by maximizing the use of concurrent (as opposed to linear) activities.
- Increased knowledge by project managers, engineers, and planners about real property procedures, eliminating sources of delays that frequently span the entire project development and delivery cycle.
- More effective integration of real property activities within the project development and delivery process.
- More effective management of real property assets through the implementation of efficient inventory and database practices that take full advantage of survey-quality data that the agency already collects to support the acquisition of real property.
- Integration between various information systems that collect or process information about real property assets, uses allowed on those assets (e.g., through permits, leases, and agreements), and monitoring of illegal encroachments.
- Increased visibility and professional opportunities for right-of-way staff within state DOTs.
- More effective contracting practices that result in higher quality, cost-effective deliverables for the agency and more competent (and competitive) contractors.

The anticipated audience for the research deliverables will be stakeholders, such as FHWA, state DOTs, LPAs, appraisers, right-of-way service consultants and contractors, and other right-of-way professionals. These stakeholders will directly benefit from the development and implementation of streamlined real property business practices. Indirectly, property owners will also take an interest in the research products under the premise that a streamlined real property and relocation assistance process will benefit all the parties involved in this process. Logical champions to take a leadership role for implementation of the research results include the FHWA Office of Planning, Environment, and Realty; AASHTO; right-of-way and design divisions at state DOTs; and relevant TRB, IRWA, and American Society of Civil Engineers (ASCE) committees. Public-sector real estate professionals and other interested stakeholders can contribute to implementation by advocating at the federal level for consideration of the proposed changes to the Uniform Act and the suggested changes to federal regulations, and advocating at the state level for potential changes to state laws as required to implement the changes.

General suggestions to implement the research results include:

- Engage research product champions early and assign specific challenges for successful implementation of the research suggestions to each champion.
- Publish and promote the research results through website links (e.g., at FHWA and TRB), presentations to state DOTs, and newsletters.
- Identify funding mechanisms and submit proposal for the implementation of the research products at one or more state DOTs (e.g., through pilot programs sponsored by the FHWA Office of Planning, Environment, and Realty).
- Develop guidebooks, sample templates and scoping forms, and other materials to support the implementation of suggested policy changes at state DOTs. These materials could be developed by the FHWA Office of Planning, Environment, and Realty through research projects or by AASHTO through pool-funded studies or initiatives.
- Evaluate, at the state level, the potential for increased use of technology to support real property business functions.
- Initiate a pooled fund study through AASHTO to define requirements, prepare a business case, and evaluate the potential for AASHTOWare™ applications to support integrated state DOT real property business functions.

- Develop criteria for monitoring the progress of implementation. Examples of potential criteria include:
  - Number of state DOTs that adopt elements of the integrated project development and delivery process model or the reference work schedule.
  - Demand for the use of training materials and/or requests for presentations.
  - Improvement in the effectiveness of the real property acquisition and relocation assistance process (e.g., in terms of average number of days required to acquire real property, costs, property owner satisfaction with the services received from the agency, and number of properties acquired by condemnation).
  - Ranking of real property acquisition in national surveys that document causes of delay and cost overruns in project development and delivery.

Suggestions to facilitate implementation of the research results at state DOTs nationwide include the following:

- Update relevant manuals, brochures, and other similar documents at the federal level and corresponding publications at the state DOT level to depict both the project development and delivery process and the acquisition of real property and relocation assistance process using the Level 1, Level 2, and Level 3 process diagrams (Figure 10, Figure 11, and Figure 23, respectively, all in Chapter 3). For some publications, particularly those that include depictions of the Level 2 or Level 3 diagrams, it is advisable or necessary to include partial or complete descriptions of the corresponding activities as shown in Appendix C.
- Make the Level 1, Level 2, and Level 3 diagrams (both Visio and PDF files) as well as the reference work schedule (both Project and PDF files) that appear on CRP-CD 154 available online so that they can be accessed more broadly by the transportation community.
- Develop a diagram similar to the Level 3 diagram to depict 49 CFR 24 workflows. Comparing this diagram to the Level 3 diagram (which depicts the real property acquisition and relocation assistance process in accordance with the Uniform Act) would illustrate sequences and interdependencies according to the regulations, which could be used for outreach and training efforts. The diagram would also further illustrate differences between the act and the regulations, which could be used to identify and visualize regulations that exceed the basic requirements in the Uniform Act.
- Develop a 1-day course through NHI, IRWA, or other, similar organizations, that provides an overview of the integrated project development and delivery process model, the reference work schedule, and the suggested strategies, and provides guidance to state DOTs and LPAs on the adoption of these models and strategies.
- Seek funding through FHWA for state-specific implementation assessment workshops to help states identify gaps in their current real property business practices (in terms of the process models) and to develop detailed implementation plans for transitioning to the suggested process models.

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List of Abbreviations

2D	Two-dimensional
3D	Three-dimensional
4D	Four-dimensional
5D	Five-dimensional
6D	Six-dimensional
1R	Preventive maintenance (may also be abbreviated PM)
2R	Non-freeway resurfacing or restoration
3R	Non-freeway rehabilitation
4R	New location and reconstruction
5R	Mobility corridor
BAFO	Best and final offer
BIM	Building information modeling
BLM	Bureau of Land Management
BPMN	Business process model and notation
CAD	Computer-aided design
CE	Categorical exclusion
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CI	Construction Institute
CMA	Construction maintenance agreement
CMS	Changeable message sign
CSS	Context-sensitive solution
DOT	Department of transportation
DTM	Digital terrain model
EA	Environmental assessment
EIS	Environmental impact statement
EJ	Environmental justice
EPCRA	Emergency Planning and Community Right-to-Know Act
ER	Entity relationship
EST	Environmental Screening Tool
ETAT	Environmental Technical Advisory Team
ETDM	Efficient Transportation Decision Making

FF	Finish-to-finish
FGDC	Federal Geographic Data Committee
FGDL	Florida Geographic Data Library
FONSI	Finding of no significant impact
FS	Finish-to-start
GAO	General Accounting Office (now the Government Accountability Office)
GASB	Governmental Accounting Standards Board
GIS	Geographic information system
GMAP	Government Management Accountability and Performance
GPS	Global positioning system
GSA	General Services Administration
HBA	Highway Beautification Act
HOV	High-occupancy vehicle
IDEF	Integration Definition
IRWA	International Right-of-Way Association
ITS	Intelligent transportation system
KML	Keyhole markup language
LDCA	Location and design concept acceptance
LEP	Limited English proficiency
LOS	Level of service
LPA	Local public agency
LRTP	Long-range transportation plan
MDL	Master deliverable list
MIS	Major investment study
MOU	Memorandum of understanding
MPO	Metropolitan planning organization
MTP	Metropolitan transportation plan
NEPA	National Environmental Policy Act
NHI	National Highway Institute
NHS	National Highway System
NILS	National Integrated Land System
NSDI	National Spatial Data Infrastructure
OGC	Open Geospatial Consortium
PD	Project development
PDF	Portable document format
PEL	Planning and environmental linkage
PII	Personal identifiable information
PLSS	Public Land Survey System
PM	Preventive maintenance (may also be abbreviated 1R)
PS&E	Plans, specifications, and estimates
QA/QC	Quality assurance/quality control
QL	Quality level
QLA	Quality level A
QLB	Quality level B
QLC	Quality level C

QLD	Quality level D
ROD	Record of Decision
ROW	Right-of-way
SARA	Superfund Amendments and Reauthorization Act
SEIR	State environmental impact report
SEPA	State Environmental Policy Act
SF	Start-to-finish
SHRP 2	Second Strategic Highway Research Program
SHS	State Highway System
SIS	Strategic Intermodal System
SS	Start-to-start
STIP	Statewide transportation improvement program
STP	Statewide transportation plan
TTI	Texas A&M Transportation Institute
UML	Unified Modeling Language
UORR	Utility object relocation record
U.S.C.	U.S. Code
USPAP	Uniform Standards of Professional Appraisal Practice
UTP	Unified transportation program
VE	Value engineering
WBS	Work breakdown structure
WUTC	Washington Utilities Transportation Commission

APPENDIX A

Survey Instrument

SURVEY FORM (STATE DOT OFFICIALS)

Name: _____
Title: _____
Agency: _____
Division, Office, or Bureau: _____
Mailing address: _____
Phone number: _____
Email address: _____

1. What is your position/title? *Check all that apply (select the option(s) most closely matching your official title and functions).*

Level	Headquarters	Region	District
Director/Head	☐	☐	☐
Section Manager	☐	☐	☐
Staff/Support	☐	☐	☐
Other	☐	☐	☐
If other, please specify:			

2. In what phase(s) of the transportation project development and delivery process are you personally involved? *Check all that apply.*

☐ Planning, feasibility studies, and programming
☐ Preliminary/conceptual design
☐ Environmental process
☐ Right-of-way acquisition
☐ Utility coordination and relocation
☐ Design
☐ Letting
☐ Construction
☐ Post-construction
☐ Legal
☐ Other: _____

3. In what right-of-way acquisition-related activities are you personally involved (the following question focuses on property management activities)? *Check all that apply.*

- ☐ Appraisal planning
- ☐ Surveying/right-of-way staking
- ☐ Preparation of parcel maps and documentation
- ☐ Environmental coordination
- ☐ Appraisals
- ☐ Appraisal review
- ☐ Appraisal approval
- ☐ Negotiation planning
- ☐ Negotiations
- ☐ Administrative settlements
- ☐ Mediation before condemnation proceedings
- ☐ Condemnation proceedings
- ☐ Titles and closing
- ☐ Relocation planning
- ☐ Comparable/replacement property identification
- ☐ Payment calculations
- ☐ Relocation assistance advisory
- ☐ Relocation payments and moving claims
- ☐ Contractor management
- ☐ Right-of-way program administration
- ☐ Utility relocation and accommodation
- ☐ Training
- ☐ Other: _____

4. In what property management activities are you personally involved? *Check all that apply.*

- ☐ Records management
- ☐ Inventory of improvements
- ☐ Disposition of improvements
- ☐ Inventory of right-of-way property interests
- ☐ Inventory of other (non-right-of-way) property interests
- ☐ Disposal of surplus right-of-way property interests
- ☐ Disposal of other surplus (non-right-of-way) property interests
- ☐ Management of mineral rights
- ☐ Management of leases, easements, and other similar instruments
- ☐ Right-of-way encroachment enforcement
- ☐ Utility permitting
- ☐ Railroad property sales and leasing
- ☐ Railroad crossing management
- ☐ Access management
- ☐ Access/driveway permitting
- ☐ Outdoor advertising control
- ☐ Junkyard control
- ☐ Financial assessments (e.g., Governmental Accounting Standards Board [GASB]-34)
- ☐ Other: _____

5. What kind of property interests does your agency normally acquire for transportation projects? *Check all that apply.*

Property Interest	Always	Frequently	Rarely	Never
Fee simple	○	○	○	○
All, except mineral rights	○	○	○	○
All, except oil and gas rights	○	○	○	○
Water rights	○	○	○	○
Right-of-way access rights	○	○	○	○
Road easement from private owner	○	○	○	○
Road easement from another state government agency or local political subdivision/LPA	○	○	○	○
Road easement from a federal agency (federal land transfer)	○	○	○	○
Road easement over Native American land	○	○	○	○
Dedicated property (e.g., deed restrictions)	○	○	○	○
Lease from private owner	○	○	○	○
Lease from another state government agency or local political subdivision/LPA	○	○	○	○
Other	○	○	○	○
If other, please specify:				

6. What kind of uses does your agency allow on state property or right-of-way? *Check all that apply.*

Right-of-Way Use	Allow, Revenue Producing	Allow, No Revenue	Do not Allow
Driveways (where allowed)	○	○	○
Outdoor advertising signs	○	○	○
Air space leases	○	○	○
Water leases	○	○	○
Oil and gas leases	○	○	○
Mineral leases (other than oil or gas)	○	○	○
Utilities: Longitudinal distribution lines	○	○	○
Utilities: Longitudinal transmission lines	○	○	○
Utilities: Distribution line crossings	○	○	○
Utilities: Transmission line crossings	○	○	○
Farm crossings	○	○	○
Carbon sequestration	○	○	○
Wildlife habitats	○	○	○
Solar energy generation	○	○	○
Wind energy generation	○	○	○
Residential dwelling leases	○	○	○
Non-residential leases	○	○	○
Mailboxes	○	○	○
Other	○	○	○
If other, please specify:			

7. What type of data management platform(s) do you use for property management purposes? *Check all that apply.*

Data Management Platform	Heavy Use	Moderate Use	Light Use	Do Not Use
Spreadsheet (Excel, OpenOffice, other)	○	○	○	○
Word processor (Word, Word Perfect, other)	○	○	○	○
Desktop database (Access, other)	○	○	○	○
Server-based database (SQL Server, Oracle, MySQL, other)	○	○	○	○
CAD (AutoCAD, MicroStation, other)	○	○	○	○
Desktop/Server GIS (ArcGIS, TransCAD, Geomedia, other)	○	○	○	○
Web-based viewer (Google Earth, Bing Maps, ArcGIS Server, other)	○	○	○	○
Legacy system (mainframe)	○	○	○	○
Other	○	○	○	○
If other, please specify:				

8. What is the overall impact of these issues at your agency? *Check all that apply.*

1 = Least impact
5 = Most impact

Issue	1	2	3	4	5
Requirements in state laws or regulations requiring steps in the right-of-way acquisition process beyond those required by the Uniform Act	○	○	○	○	○
Not involving right-of-way staff during:					
Planning, feasibility studies, and programming	○	○	○	○	○
Preliminary/conceptual design	○	○	○	○	○
Environmental process	○	○	○	○	○
Utility coordination and relocation	○	○	○	○	○
Design	○	○	○	○	○
Letting and construction	○	○	○	○	○
Inadequate cost estimates for right-of-way acquisition due to:					
Unanticipated impact of fast-growth and development in the area	○	○	○	○	○
Unanticipated impact of speculative buying or quickly developed changes in property use	○	○	○	○	○
Lack of consideration or incorrect estimation of area-wide real property inflation	○	○	○	○	○
Not updating right-of-way acquisition cost estimates at regular intervals during the project development process	○	○	○	○	○
Inaccurate appraisals prior to negotiations	○	○	○	○	○
Entities (e.g., law firms, advising property owners not to negotiate as a tactic to obtain more money during condemnation proceedings)	○	○	○	○	○
Entities (e.g., law firms, advising property owners to divide their property into smaller parcels as a tactic to obtain more money from the state DOT)	○	○	○	○	○
Incomplete or inaccurate initial title searches requiring re-work during acquisition activities	○	○	○	○	○
Changes to parcels to acquire due to late changes during the design phase	○	○	○	○	○
Changes to parcels being acquired due to changes during construction	○	○	○	○	○
Difficulty to hire and retain staff with adequate right-of-way acquisition experience	○	○	○	○	○
Right-of-way staff turnover	○	○	○	○	○
Lack of public-sector right-of-way experience among consultant staff used for the project	○	○	○	○	○
Higher-than-average condemnation rates in which a consultant or other private-sector partner conducted right-of-way acquisition activities	○	○	○	○	○
Difficult-to-use database or information system documenting right-of-way acquisitions and transactions at the agency	○	○	○	○	○
Other	○	○	○	○	○
If other, please specify (provide examples if possible):					

9. What is the overall impact of the following property management issues at your agency?
Check all that apply.

1 = Least impact
5 = Most impact

Issue	1	2	3	4	5
Difficult-to-use database or information system documenting right-of-way assets owned by the agency	○	○	○	○	○
Delays in billing and/or collecting lease revenues from right-of-way parcels managed by the agency prior to the start of the construction phase	○	○	○	○	○
Incomplete deed records for previous right-of-way acquisitions by the agency	○	○	○	○	○
Difficulty in tracking the disposal of surplus right-of-way interests	○	○	○	○	○
Difficulty in tracking the disposal of other surplus (non-right-of-way) property interests	○	○	○	○	○
Deed restrictions on sale of surplus property	○	○	○	○	○
Difficulty in tracking and monitoring the use of property/right-of-way assets	○	○	○	○	○
Illegal/unauthorized right-of-way encroachments	○	○	○	○	○
Difficult-to-track permit applications (e.g., driveway, utilities, etc.)	○	○	○	○	○
Other	○	○	○	○	○
If other, please specify (provide examples if possible):					

10. Which property acquisitions are particularly problematic (e.g., in terms of time and cost)? *Check all that apply.*

Activities:

(a) Parcel appraisals
(b) Right-of-way negotiations
(c) Condemnation proceedings
(d) Relocations
(e) Utility relocation and accommodation
(f) Coordination with other transportation project development areas
(g) Coordination with other stakeholders, including LPAs

Property Type and Location	Activity						
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Residential, developed	☐	☐	☐	☐	☐	☐	☐
Residential, undeveloped	☐	☐	☐	☐	☐	☐	☐
Non-residential, developed	☐	☐	☐	☐	☐	☐	☐
Non-residential, undeveloped	☐	☐	☐	☐	☐	☐	☐
Full acquisitions	☐	☐	☐	☐	☐	☐	☐
Partial acquisitions	☐	☐	☐	☐	☐	☐	☐
Uneconomic remainders	☐	☐	☐	☐	☐	☐	☐
Outdoor advertising sign interests	☐	☐	☐	☐	☐	☐	☐
Railroads (abandoned railroad interests)	☐	☐	☐	☐	☐	☐	☐
Railroads (operating railroad interests)	☐	☐	☐	☐	☐	☐	☐
Tribal lands	☐	☐	☐	☐	☐	☐	☐
Federal lands	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐
If other, please specify:							

Provide examples if possible.

_____

_____

_____

11. What lessons has your agency learned from outsourcing right-of-way activities (e.g., in terms of costs, right-of-way delivery, coordination with other stakeholders, contracting)?

_____

_____

_____

12. What performance measures are (should be) in place at your agency to monitor the effectiveness of right-of-way processes? *Check all that apply.*

Note:

Select **In Place** if the performance measure is currently in place at your agency. Otherwise, leave the box blank.

Select **Needed** if there is a need for the performance measure, regardless of current implementation status. Otherwise, leave the box blank.

Performance Measure	In Place	Needed
Number of parcels/property interests to acquire	☐	☐
Time to complete critical activities (e.g., appraisal, appraisal review, negotiations, administrative settlement, mediation, condemnation proceedings, relocation assistance, etc.)	☐	☐
Time to letting	☐	☐
Time to the start of construction	☐	☐
Difference between administrative settlement amount and approved appraisal	☐	☐
Frequency of administrative settlements	☐	☐
Number of properties acquired by negotiation	☐	☐
Number of properties acquired by mediation	☐	☐
Number of properties acquired by condemnation proceedings	☐	☐
Number of properties acquired or in possession prior to letting	☐	☐
Ratio of right-of-way expenditures to right-of-way allocations	☐	☐
Variation in right-of-way acquisition cost estimates at critical milestones in the project development process	☐	☐
Number of surplus right-of-way interests to sell	☐	☐
Time to complete critical activities related to the disposal of surplus property	☐	☐
Revenue generated from surplus property interests sold	☐	☐
Revenue generated from management of right-of-way assets	☐	☐
Budget allocated to right-of-way staff training and professional development	☐	☐
Effectiveness of training and professional development activities	☐	☐
Budget allocated to right-of-way asset management activities	☐	☐
Staff turnover rate	☐	☐
Other	☐	☐
If other, please specify:		

13. Which of the following laws and/or regulations require urgent changes to streamline right-of-way processes at your agency? *Check all that apply.*

Note: The Uniform Act (codified as 42 U.S.C. 4601 et seq.) provides the basic federal *law* for uniform right-of-way acquisition and relocation assistance. 49 CFR 24 provides *regulations* at the federal level to implement the Uniform Act. For additional information, please visit http://www.fhwa.dot.gov/realestate/ua/index.htm.

Right-of-Way Activity	Uniform Act	49 CFR 24	State Law (your state)	State Regulations (your state)
Appraisal planning	☐	☐	☐	☐
Preparation of parcel maps and documentation	☐	☐	☐	☐
Appraisals	☐	☐	☐	☐
Appraisal review	☐	☐	☐	☐
Appraisal approval	☐	☐	☐	☐
Negotiation planning	☐	☐	☐	☐
Negotiations	☐	☐	☐	☐
Administrative settlements	☐	☐	☐	☐
Mediation before condemnation proceedings	☐	☐	☐	☐
Condemnation proceedings	☐	☐	☐	☐
Titles and closing	☐	☐	☐	☐
Relocation planning	☐	☐	☐	☐
Comparable/replacement property identification	☐	☐	☐	☐
Payment calculations	☐	☐	☐	☐
Relocation assistance	☐	☐	☐	☐
Relocation payments and moving claims	☐	☐	☐	☐
Records management	☐	☐	☐	☐
Property management	☐	☐	☐	☐
Contractor management	☐	☐	☐	☐
Right-of-way program administration	☐	☐	☐	☐
Other	☐	☐	☐	☐
If other, please specify:				

14. What specific changes need to be introduced in laws and regulations (see previous question) to streamline right-of-way processes?

_____

_____

_____

15. What business practices at your agency (whether or not required by current laws or regulations) would likely result in significant streamlining of right-of-way processes?

_____

_____

_____

16. What unique processes exist at your agency in addition to the requirements in the Uniform Act, and what impact have they had on your agency's ability to manage the right-of-way process effectively?

_____

_____

_____

17. What strategies or innovative approaches (including participation in FHWA pilot programs and/or training) has your agency implemented or plan to implement to streamline the right-of-way process?

_____

_____

_____

18. What kind of training and professional development does the state DOT offer to staff members who work with state DOT clients in right-of-way activities?

_____

_____

_____

19. May we contact you to further discuss your agency's right-of-way acquisition and asset management practices and needs?

○ Yes
○ No

SURVEY FORM (CONSULTANTS)

Name: _____
Title: _____
Company: _____
Division, Office: _____
Mailing address: _____
Phone number: _____
Email address: _____

1. What is the geographic range of your company's consulting activities?

○ National/international
○ Regional
○ State
○ Local

2. In what phase(s) of the transportation project development and delivery process are you personally involved? *Check all that apply.*

☐ Planning, feasibility studies, and programming
☐ Preliminary/conceptual design
☐ Environmental process
☐ Right-of-way acquisition
☐ Utility coordination and relocation
☐ Design
☐ Letting
☐ Construction
☐ Post-construction
☐ Legal
☐ Other: _____

3. In what right-of-way acquisition activities have you or your company participated over the last five years? *Check all that apply.*

- ☐ Appraisal planning
- ☐ Surveying/right-of-way staking
- ☐ Preparation of parcel maps and documentation
- ☐ Environmental coordination
- ☐ Appraisals
- ☐ Appraisal review
- ☐ Appraisal approval
- ☐ Negotiation planning
- ☐ Negotiations
- ☐ Administrative settlements
- ☐ Mediation before condemnation proceedings
- ☐ Condemnation proceedings
- ☐ Titles and closing
- ☐ Relocation planning
- ☐ Comparable/replacement property identification
- ☐ Payment calculations
- ☐ Relocation assistance advisory
- ☐ Relocation payments and moving claims
- ☐ Contractor management
- ☐ Right-of-way program administration
- ☐ Utility relocation and accommodation
- ☐ Training
- ☐ Other: _____

4. In what property management activities have you or your company participated over the last five years? *Check all that apply.*

- ☐ Records management
- ☐ Inventory of improvements
- ☐ Disposition of improvements
- ☐ Inventory of right-of-way property interests
- ☐ Inventory of other (non-right-of-way) property interests
- ☐ Disposal of surplus right-of-way property interests
- ☐ Disposal of other surplus (non-right-of-way) property interests
- ☐ Management of mineral rights
- ☐ Management of leases, easements, and other similar instruments
- ☐ Right-of-way encroachment enforcement
- ☐ Utility permitting
- ☐ Railroad property sales and leasing
- ☐ Railroad crossing management
- ☐ Access management
- ☐ Access/driveway permitting
- ☐ Outdoor advertising control
- ☐ Junkyard control
- ☐ Financial assessments (e.g., GASB-34)
- ☐ Other: _____

5. What is the impact of these issues on your client state agencies based on your interactions and involvement in their right-of-way processes? *Check all that apply.*

1 = Least impact
5 = Most impact

Issue	1	2	3	4	5
Requirements in state laws or regulations requiring steps in the right-of-way acquisition process beyond those required by the Uniform Act	○	○	○	○	○
Not involving right-of-way staff during:					
Planning, feasibility studies, and programming	○	○	○	○	○
Preliminary/conceptual design	○	○	○	○	○
Environmental process	○	○	○	○	○
Utility coordination and relocation	○	○	○	○	○
Design	○	○	○	○	○
Letting and construction	○	○	○	○	○
Inadequate cost estimates for right-of-way acquisition due to:					
Unanticipated impact of fast-growth and development in the area	○	○	○	○	○
Unanticipated impact of speculative buying or quickly developed changes in property use	○	○	○	○	○
Lack of consideration or incorrect estimation of area-wide real property inflation	○	○	○	○	○
Not updating right-of-way acquisition cost estimates at regular intervals during the project development process	○	○	○	○	○
Inaccurate appraisals prior to negotiations	○	○	○	○	○
Entities (e.g., law firms, advising property owners not to negotiate as a tactic to obtain more money during condemnation proceedings)	○	○	○	○	○
Entities (e.g., law firms, advising property owners to divide their property into smaller parcels as a tactic to obtain more money from the state DOT)	○	○	○	○	○
Incomplete or inaccurate initial title searches requiring re-work during acquisition activities	○	○	○	○	○
Changes to parcels to acquire due to late changes during the design phase	○	○	○	○	○
Changes to parcels being acquired due to changes during construction	○	○	○	○	○
Difficulty to hire and retain staff with adequate right-of-way acquisition experience	○	○	○	○	○
Right-of-way staff turnover	○	○	○	○	○
Lack of public-sector right-of-way experience among consultant staff used for the project	○	○	○	○	○
Higher-than-average condemnation rates in which a consultant or other private-sector partner conducted right-of-way acquisition activities	○	○	○	○	○
Difficult-to-use database or information system documenting right-of-way acquisitions and transactions at the agency	○	○	○	○	○
Other	○	○	○	○	○
If other, please specify (provide examples if possible):					

6. What is the overall impact of the following property management issues on your client state agencies based on your interactions and involvement in their right-of-way processes? *Check all that apply.*

1 = Least impact
5 = Most impact

Issue	1	2	3	4	5
Difficult-to-use database or information system documenting right-of-way assets owned by the agency	○	○	○	○	○
Delays in billing and/or collecting lease revenues from right-of-way parcels managed by the agency prior to the start of the construction phase	○	○	○	○	○
Incomplete deed records for previous right-of-way acquisitions by the agency	○	○	○	○	○
Difficulty in tracking the disposal of surplus right-of-way interests	○	○	○	○	○
Difficulty in tracking the disposal of other surplus (non-right-of-way) property interests	○	○	○	○	○
Deed restrictions on sale of surplus property	○	○	○	○	○
Difficulty in tracking and monitoring the use of property/right-of-way assets	○	○	○	○	○
Illegal/unauthorized right-of-way encroachments	○	○	○	○	○
Difficult-to-track permit applications (e.g., driveway, utilities, etc.)	○	○	○	○	○
Other	○	○	○	○	○
If other, please specify (provide examples if possible):					

7. Which property acquisitions are particularly problematic (e.g., in terms of time and cost)? *Check all that apply.*

Activities:

(a) Parcel appraisals
(b) Right-of-way negotiations
(c) Condemnation proceedings
(d) Relocations
(e) Utility relocation and accommodation
(f) Coordination with other transportation project development areas
(g) Coordination with other stakeholders, including LPAs

Property Type and Location	Activity						
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Residential, developed	☐	☐	☐	☐	☐	☐	☐
Residential, undeveloped	☐	☐	☐	☐	☐	☐	☐
Non-residential, developed	☐	☐	☐	☐	☐	☐	☐
Non-residential, undeveloped	☐	☐	☐	☐	☐	☐	☐
Full acquisitions	☐	☐	☐	☐	☐	☐	☐
Partial acquisitions	☐	☐	☐	☐	☐	☐	☐
Uneconomic remainders	☐	☐	☐	☐	☐	☐	☐
Outdoor advertising sign interests	☐	☐	☐	☐	☐	☐	☐
Railroads (abandoned railroad interests)	☐	☐	☐	☐	☐	☐	☐
Railroads (operating railroad interests)	☐	☐	☐	☐	☐	☐	☐
Tribal lands	☐	☐	☐	☐	☐	☐	☐
Federal lands	☐	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐	☐
If other, please specify:							

Provide examples if possible.

_____

_____

_____

8. Which of the following laws and/or regulations require <u>urgent</u> changes to streamline right-of-way processes in your state? *Check all that apply.*

Note: The Uniform Act (codified as 42 U.S.C. 61) provides the basic federal *law* for uniform right-of-way acquisition and relocation assistance. 49 CFR 24 provides *regulations* at the federal level to implement the Uniform Act. For additional information, please visit http://www.fhwa.dot.gov/realestate/ua/index.htm.

Right-of-Way Activity	Uniform Act	49 CFR 24	State Law (your state)	State Regulations (your state)
Appraisal planning	☐	☐	☐	☐
Preparation of parcel maps and documentation	☐	☐	☐	☐
Appraisals	☐	☐	☐	☐
Appraisal review	☐	☐	☐	☐
Appraisal approval	☐	☐	☐	☐
Negotiation planning	☐	☐	☐	☐
Negotiations	☐	☐	☐	☐
Administrative settlements	☐	☐	☐	☐
Mediation before condemnation proceedings	☐	☐	☐	☐
Condemnation proceedings	☐	☐	☐	☐
Titles and closing	☐	☐	☐	☐
Relocation planning	☐	☐	☐	☐
Comparable/replacement property identification	☐	☐	☐	☐
Payment calculations	☐	☐	☐	☐
Relocation assistance	☐	☐	☐	☐
Relocation payments and moving claims	☐	☐	☐	☐
Records management	☐	☐	☐	☐
Property management	☐	☐	☐	☐
Contractor management	☐	☐	☐	☐
Right-of-way program administration	☐	☐	☐	☐
Other: _____	☐	☐	☐	☐
If other, please specify:				

9. What specific changes need to be introduced in laws and regulations (see previous question) to streamline right-of-way processes?

_____

_____

_____

10. What kind of training and professional development does your company offer to staff members who work with state DOT clients in right-of-way activities?

_____

_____

_____

11. May we contact you to further discuss your company's right-of-way acquisition and asset management work with state DOTs?

○ Yes
○ No

APPENDIX B

Survey Results

Results—State Departments of Transportation

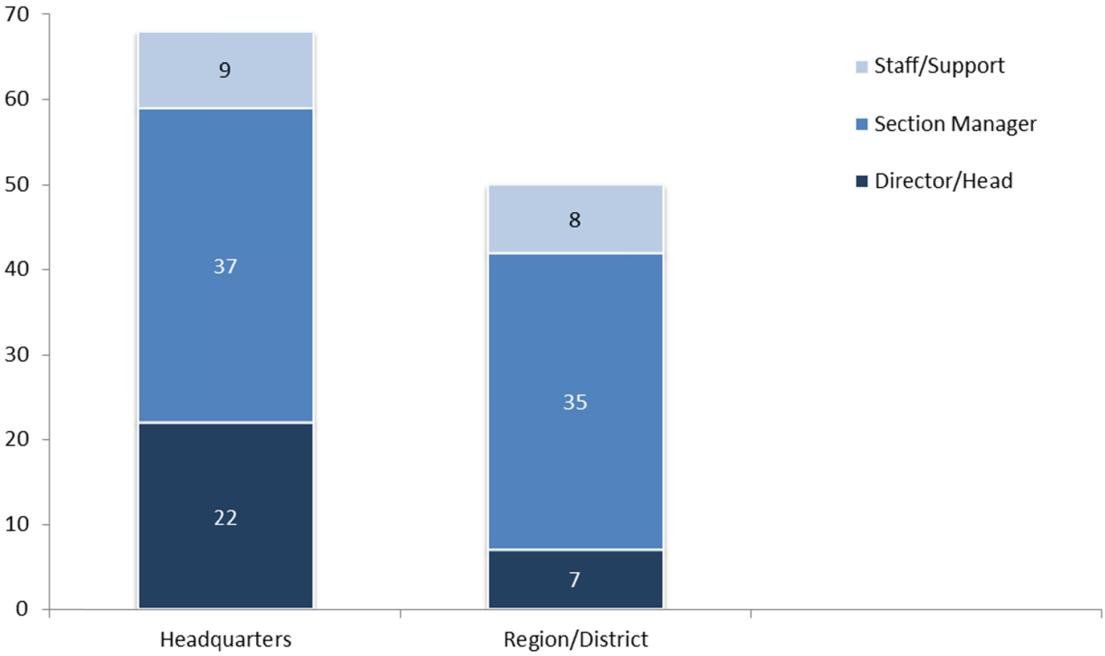
General Observations

Figure B-1 summarizes the distribution of state DOT participants by office location and responsibility. In total, 58 percent of participants were participants from headquarters, with the remaining 42 percent of participants representing field offices. Of all participants, 25 percent were directors, 61 percent were managers (including participants who did not select any of the other two categories but, from the responses provided, appeared to have a managerial position), and the remaining 14 percent were support staff. These results indicate the survey had ample participation from field offices and that a wide range of participants across hierarchies responded to the survey. (Note: The survey included the option for participants to differentiate between regions and districts as a mechanism to identify an intermediate level between headquarters and districts. However, the differentiation ended up being unnecessary because state DOTs use a wide range of names to designate non-headquarters locations.)

Of the 38 state DOTs represented in the survey, 19 state DOTs had one participant, 7 state DOTs had two participants, 7 state DOTs had 3–4 participants, and five state DOTs had five or more participants. One state DOT had 15 participants. The average number of participants per state DOT was 2.7. Although the range in the number of participants per state DOT means there is some bias in the data, it is important to take into consideration the following:

- Some state DOTs decided to disseminate the survey manually (e.g., by printing the survey instrument from the website) and gather feedback from their various offices before responding to the online survey. Presumably, this could be an indication that, at least in some cases in which there was one participant per state, the response included feedback from more than one individual and/or office.
- After removing three states that had the largest number of responses per state (California, Minnesota, and Ohio, totaling 33 responses), the research team produced a second set of summary tables and charts for the remaining 71 records. Although there were differences between the original set of results and the (reduced) modified versions, the trends were strikingly similar. A significant difference was in relation to the perception of higher-than-average condemnation rates when consultants or other partner agencies conduct real property acquisitions. For this item, removing the three states with the largest number of responses caused the item to be ranked much lower in the chart than when those states were included in the tabulation. There were also differences regarding the perception of the need for urgent changes to laws and regulations. However, these differences are not significant given that the overall response rate for this question was already low even without removing any state from the tabulation.

Survey participants were primarily involved in the acquisition of real property (Figure B-2). This result was not surprising given the vested interest of right-of-way professionals in the research and its results. Involvement was also substantial in activities such as legal, utility coordination, planning and programming, and preliminary design. Survey participant involvement in other project development and delivery phases (particularly environmental, design, letting, and construction) was relatively minor. Involvement in real property acquisition activities covered the entire spectrum, from appraisals to payments (Figure B-3). Interestingly, only a few participants were involved in preparing right-of-way maps, surveying, or right-of-way staking activities. The responses classified as "other" in Figure B-2 and Figure B-3 corresponded to a variety of cases, ranging from "worked in all of the above in the past" to "demolition, clearance/property management" and "litigation and property management."



Note: The total number of entries was 118, which was larger than the number of state DOT participants. Some participants marked more than one cell, possibly indicating multiple levels of responsibility or geographic location.

Figure B-1. Distribution of state DOT participants by office location and responsibility.

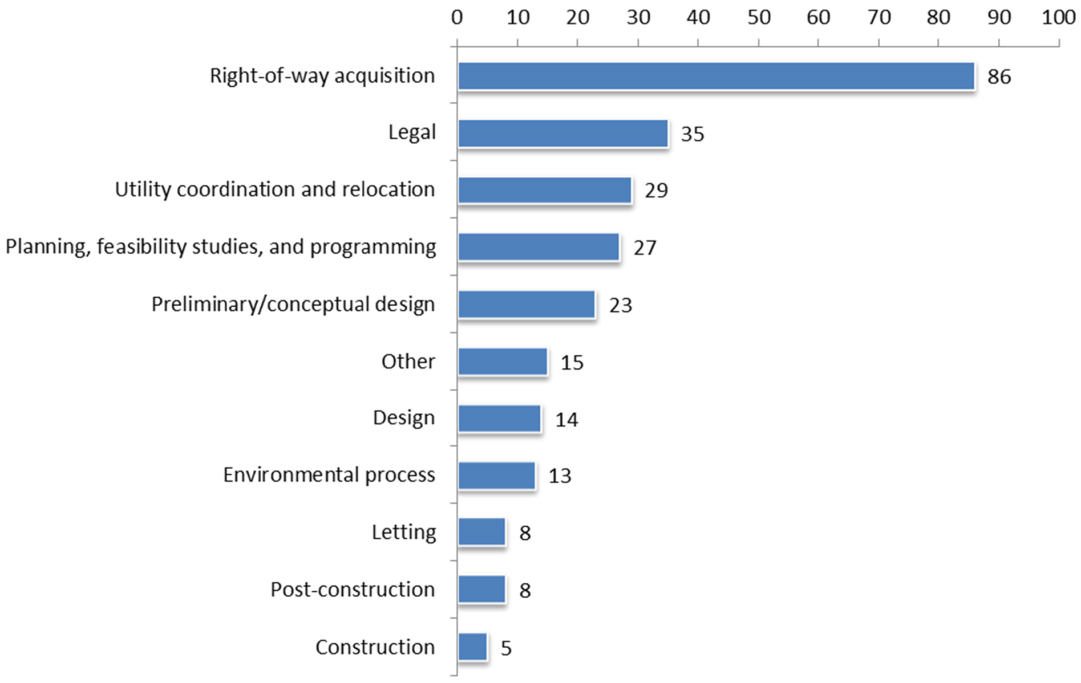


Figure B-2. Involvement of state DOT participants in project development and delivery process activities.

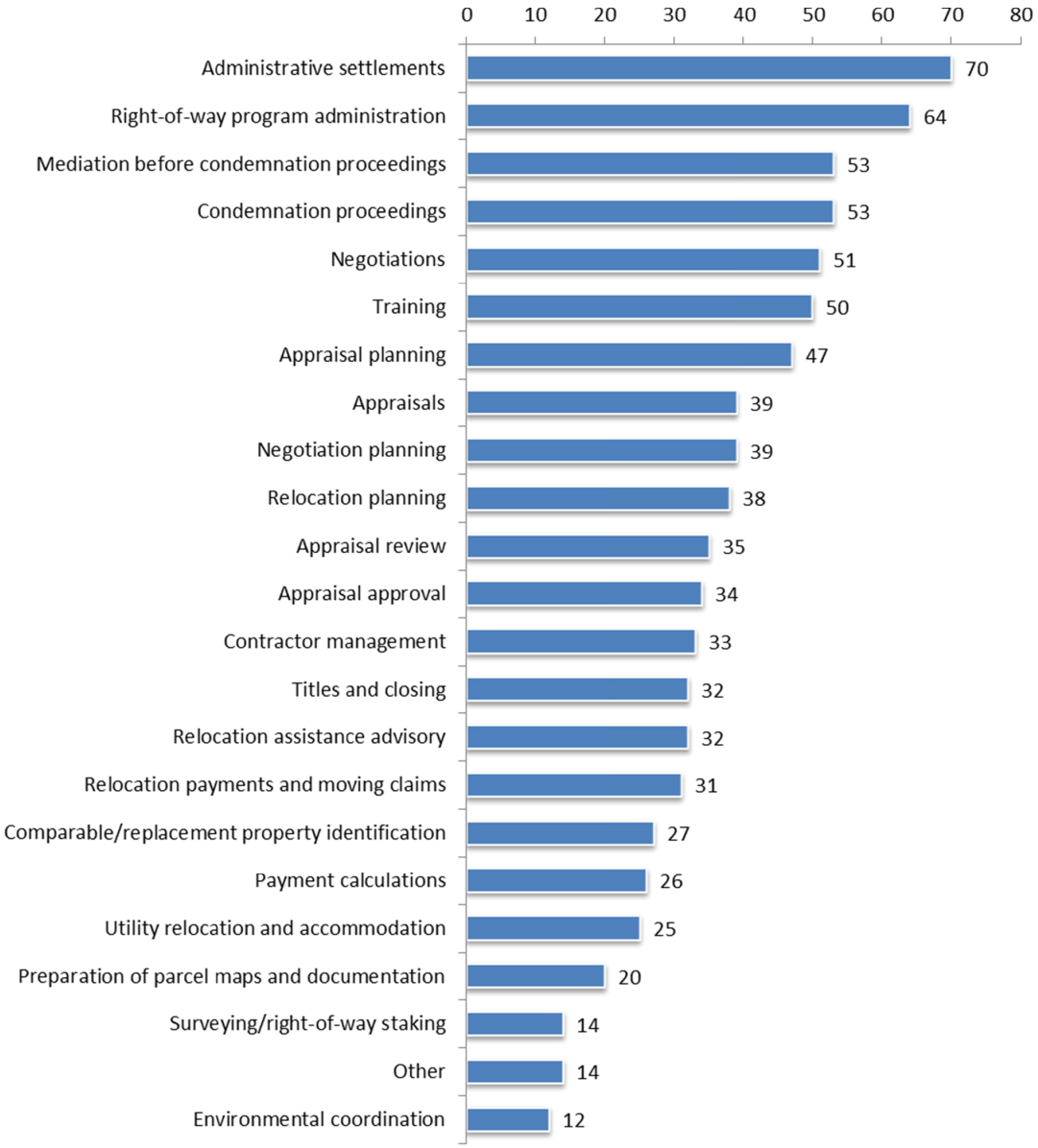


Figure B-3. Involvement of state DOT participants in real property acquisition.

Issues and Challenges

Figure B-4 summarizes the responses in relation to the perceived level of impact of major issues that state DOTs face while acquiring real property for transportation projects. In the figure, the darker the color means the higher the perception of impact. The impact scale is from 1 (least impact) to 5 (most impact). For convenience, rows are sorted by the frequency of responses when grouping the total number of responses associated with impact levels 3, 4, and 5. However, it is interesting to note that sorting rows by grouping responses associated with impact levels 4 and 5 would have produced a similar graph.

As Figure B-4 shows, close to 80 percent of participants indicated the highest impact was due to changes to parcels late in the design phase and due to lack of involvement of right-of-way staff during design. Not involving right-of-way personnel in earlier phases (planning and programming, preliminary design, and environmental process) as well as during utility coordination was also perceived as having a major impact. Changes to parcels late in the design phase and lack of involvement of right-of-way staff during design are critical issues, particularly considering the push at many state DOTs to accelerate and/or compress the design phase in an effort to shorten the development and delivery of transportation projects.

Respondents also pointed to staffing issues as having a major impact, including difficulty to hire and retain staff with adequate real property acquisition experience and staff turnover. Respondents further highlighted that a significant issue

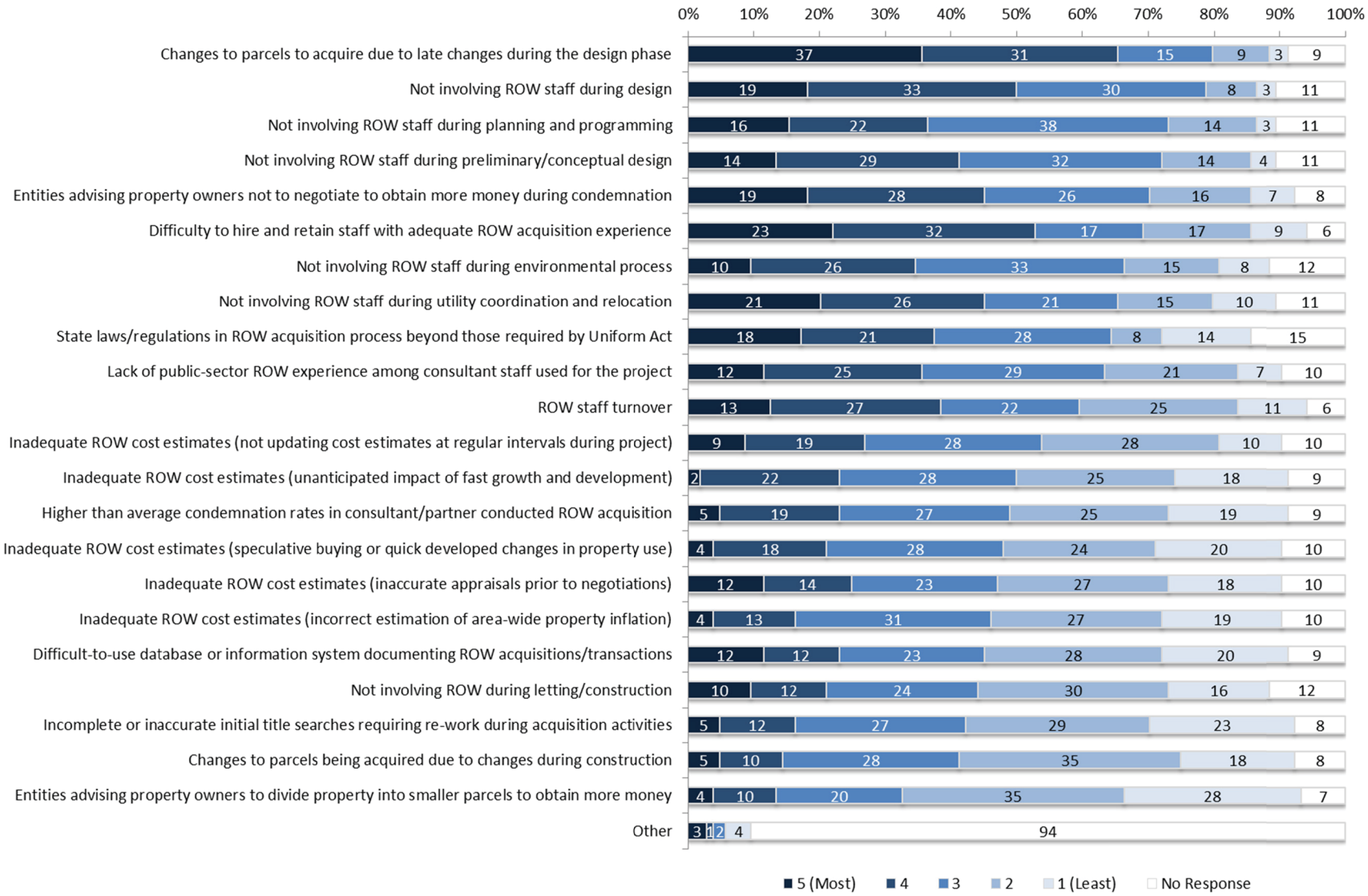


Figure B-4. Level of impact of major issues related to real property acquisition at state DOTs.

they face is the lack of public-sector real property experience among consultants.

A significant issue that resonated with many survey participants across the country was external entities (e.g., law firms advising property owners not to negotiate as a tactic to obtain more money during condemnation proceedings). The perceived level of impact of this issue was similar to the lack of involvement of right-of-way personnel during preliminary design. Interestingly, survey participants did not believe that external entities advising property owners to divide their property into smaller parcels as a tactic to obtain more money from the state DOT was a major issue.

Survey participants indicated an important issue was requirements in state laws or regulations requiring steps in the real property acquisition process beyond those required by the Uniform Act. However, only about 35 percent of participants thought this issue was major (i.e., associated with impact levels 4 or 5).

Inadequate cost estimates for real property acquisition was an issue that resonated with survey participants. However, the level of impact resulting from inadequate cost estimates was not as high as other issues state DOT participants believed to be more pressing. One way to interpret this result is that poor cost estimates tend to affect divisions, sections, and individuals who deal with project funding issues much more so than other units within the agency that provide technical services but are not as involved in project funding considerations. A significant number of survey respondents (who represented primarily real property functions within their agencies) might belong to this second category. Unfortunately, the survey did not ask what level of responsibility individual respondents (as well as their corresponding sections or divisions) had regarding real property acquisition budgets.

Interestingly, participants did not find difficult-to-use databases or information systems documenting real property acquisitions and transactions to be a major issue. One way to interpret this result is that officials might find problems with their current databases and information systems, but given the choice about where to improve or streamline processes, they would probably select other areas to tackle first (e.g., areas related to internal communications with other units within the agency, staffing needs, cost estimates, and laws and regulations).

Other issues identified by participants as having an impact while acquiring real property for transportation projects included the following:

- Project funding uncertainty, including delays in passing state budget.
- Inadequate timeframe to accomplish the work.
- LPAs frequently do not have the required skills or knowledge to follow regulations mainly because of inexperience and understaffing.
- Poor quality of right-of-way maps.
- Arbitrary number of appraisals assigned to one appraiser.
- Required legislative contract review process and central office approval can cause it to take months to get appraisals assigned to contract appraisers.
- Fee appraisers are not familiar with how just compensation is established.
- Inadequate time to present the written offer to a property owner before condemnation.
- Amendment to state constitution that makes the state responsible for potential property owner legal fees in condemnation proceedings. The result is an increase in the number of inverse condemnations prior to the environmental process being complete.

Figure B-5 provides a listing and classification of real property acquisitions that state DOTs consider particularly problematic (e.g., in terms of time and cost). In the figure, colors provide an indication of a major real property acquisition phase or process (e.g., the darkest color means appraisal and the lightest color [white] means coordination with other stakeholders [e.g., LPAs]). Readers should note that the color sequence does not imply a business process sequence (e.g., not all real property acquisitions involve condemnation proceedings).

Rows are sorted by the total number of responses received for each type of acquisition state DOTs considered particularly problematic. For example, the total number of responses received in connection with the acquisition of operating railroad interests was 230 (including 44 responses associated with appraisals, 62 responses associated with negotiations, and so on). In general, the higher the number associated with each phase or process, the more problematic that phase or process can be. A similar consideration applies to the total number of responses.

A limitation of this question, as designed and implemented in the survey, was that the question did not ask respondents about the number or relative frequency of different types of real property acquisitions. As a result, it was not possible to ascertain whether the responses were an indication of real property acquisitions that were (structurally) more problematic than other types of acquisitions, regardless of number of acquisitions, or whether other factors (such as frequency) played a role. For example, if a state DOT did not deal with federal land acquisitions (or if this type of acquisition only happened rarely), this type of acquisition would likely not have been marked as particularly problematic.

This consideration aside, Figure B-5 indicates that state DOTs are having issues with certain types of real property acquisitions, particularly railroad interests (either operating or abandoned). Acquisitions of non-residential (developed) property and acquisitions involving outdoor advertising sign interests also tend to be problematic. Overall, partial acquisitions tend

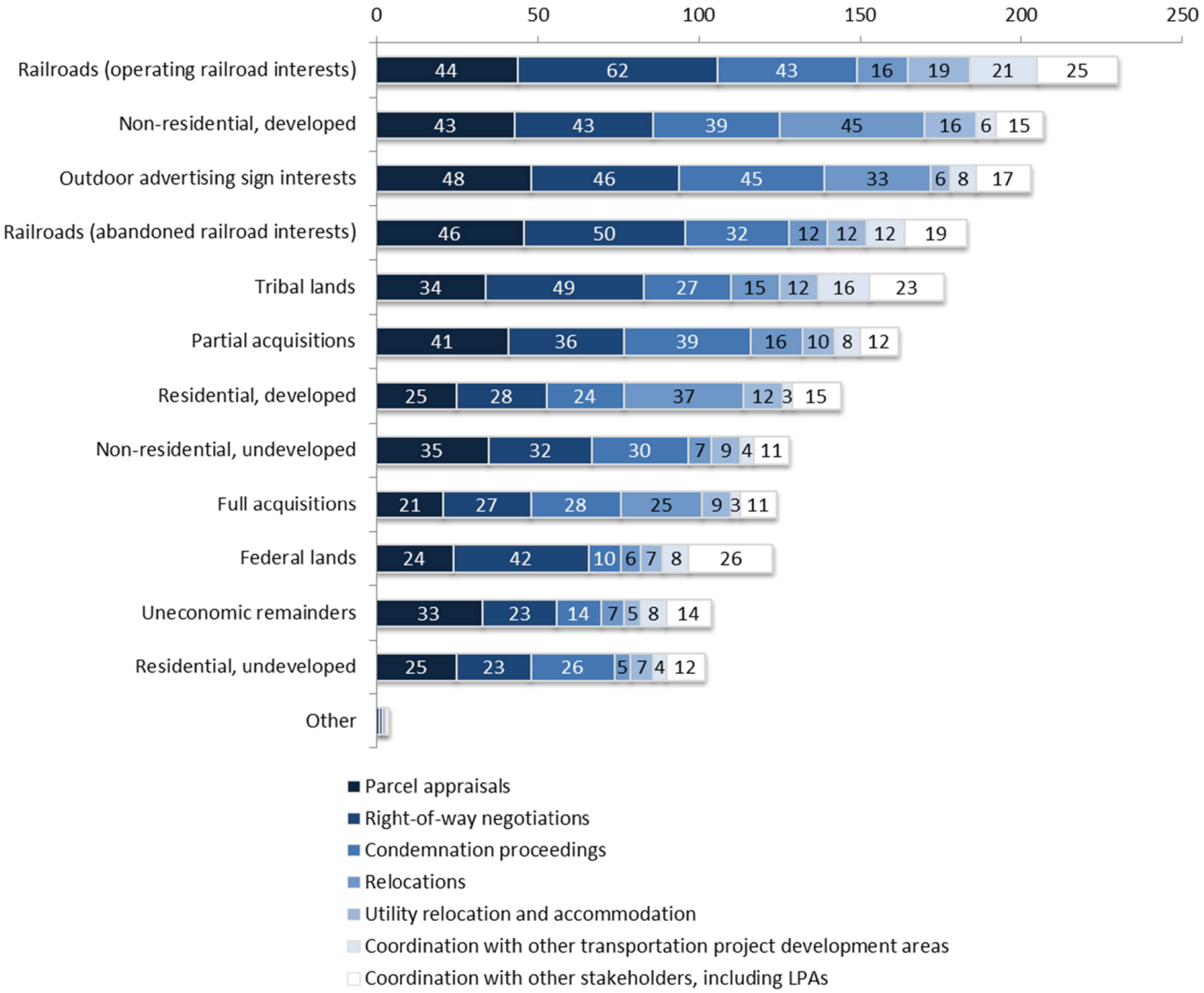


Figure B-5. Particularly problematic real property acquisitions at state DOTs.

to be more problematic than full acquisitions. Acquisitions in developed areas are more problematic than acquisitions in undeveloped areas.

Additional comments that respondents provided included the following:

- GSA is very slow to respond to state requests to acquire property. GSA does not share its own appraisal with the state, even though the state provides its appraisal to the federal government. GSA is slow to transfer property for federal-aid highways even though no transfer of funds is needed. Federal land acquisition appraisals follow the *Uniform Appraisal Standards for Federal Land Acquisitions* (also called the yellow book), which can take significantly more time to prepare. Coordination with other state and federal agencies on federal land acquisitions seems to take a particularly long time.
- Some tribes are no longer interested in the state acquiring a permanent easement. Other issues include allotments, sovereign nation status, cultural differences, and conflicting priorities. Tribal (and federal) negotiations take longer due to the amount of approvals and steps in the process.
- Utility relocations can be problematic, taking years to complete and close. Fortunately, the state can proceed with an entry agreement from many of the utility owners.
- Railroads are particularly difficult to deal with and are often nonresponsive until a suit has been filed.

Experience with Outsourcing Real Property Activities

Respondents were asked about lessons learned from outsourcing real property activities (e.g., in terms of costs, real property delivery, coordination with other stakeholders, con-

tracting). A total of 72 participants answered this question. A summary of verbatim comments, ideas, and suggestions, grouped by major topic as much as possible, follows.

- Appraisals:
  - Consultants make more mistakes than state DOT staff, but can be helpful and flexible. Finding qualified appraisers is a challenge. One lesson when hiring outside appraisers is to get them in the same room and explain the policy and procedures for determining items such as uneconomic remnants, reasonableness of access, when access has to be acquired, when it is police power, and what to look for in permits. This strategy ensures an adequate base knowledge and consistency to prevent review appraisers from having to struggle with last-minute changes.
  - Outsourcing typically results in poor- to fair-quality work. Appraisals are typically deficient in content, comparable research is not adequately conducted or documented, value conclusions are unreliable, and damages are usually not supported. It takes longer to issue the right-of-way certification.
  - Appraisal review needs to remain in-house. Both turnkey and specific activities are valid models for outsourcing. Manuals and flowcharts need to be up-to-date as a prerequisite to outsourcing. A well-written scope is critical to project success. Ongoing regular status meetings with the consultant are also critical.
  - Consultants are often not properly trained in appraising property for transportation projects, which often include partial acquisitions. Accelerated project delivery schedules result in reduced lead-time and increased cases of condemnation.
  - The state only outsources appraisals. The process works well.
- Rapport with property owners:
  - Most outsourced projects tend to be small projects. Contract acquisition firms do not work with landowners in the same way as the internal staff does. Contractors have a tendency to summarize negotiations as reaching an impasse when more negotiations may be appropriate. Internal state DOT staff are more inclined to be more patient and deliver a better product.
  - Contractors from out of state lack some credibility with property owners.
  - Our district has a limited number of in-house staff, which makes it necessary to outsource real property activities. Some landowners do not appreciate consultants as intermediaries. They would prefer to deal directly with the state. Appraisal services are good candidates for consultants (although can be expensive). It is probably not worth the expense for low-value acquisitions.
- Experience with LPAs:
  - Experience in working with LPAs when they hire consultants is not positive. There is a tendency by LPAs and their consultants to cut corners and not follow established policy, procedures, and statuses. It is very difficult to coordinate with consultants. Early involvement, clear expectations, accurate scopes of work in cooperative agreements and contracts, quality management plans, progress reviews, and closeout activities are crucial.
  - Allowing LPAs to perform real property activities has proven to be difficult and inefficient due to the lack of knowledge and expertise by LPA staff and their consultants.
  - Survey activities and document preparations (e.g., right-of-way maps, purchasing documents) are more difficult for consultants to perform.
  - The state does not outsource real property activities except when an LPA sponsors the project. In this case, the LPA hires consultants for real property activities. Consulting fees are generally higher than state-furnished real property services.
  - The state chose not to have consulting contracts with defined completion dates. This decision resulted in lower production rates. Consultants require a great deal of oversight, which makes it problematic when an LPA (or state agency) with no or little real property experience hires a consultant to assist with their program.
- Workload:
  - Difficulty in coordinating with other units within the state DOT.
  - Close coordination and frequent meetings are necessary to ensure that activities are progressing properly.
  - Many times, state DOT staff has to complete the process or take the case to condemnation. One of the problems in this case is the lack of history and documentation.
  - Outsourcing relocation activities does not lessen the load of the agency because of the need to oversee the work by consultants. Consultants frequently do not work effectively against the letting schedule, particularly in cases where a displaced person fights the relocation (then it is necessary to spend the same amount of staff time if not more in working with the consultant and the displaced person).
  - Previously, the state outsourced some of the title work, with mixed results. The state has now hired a quality attorney who does all of the title work accurately and on time. Outsourcing relocation and direct purchase does not work well. More time is spent training, reviewing, and correcting than should be necessary. It generally takes a significant amount of staff time to oversee consultants.
  - It is advisable to require an experienced project manager for each project, consider the cost of lost productivity of

internal staff up front if an inexperienced consultant is used, reserve the right to approve each individual working for the consultant, and monitor the progress of the project closely at regular intervals.
  - Working with consultants has been effective to relieve internal workloads. There have been problems when outsourcing an entire real property acquisition project.
- Costs:
  - It is not cheaper to outsource. Communication is more cumbersome and time consuming. Internal staff is much more efficient and economical.
  - Appropriation rates are higher. Costs to acquire are also higher, particularly with respect to labor costs. Real property acquisition costs are comparable. Quality appears to have been sacrificed for speed.
  - Outsourcing real property functions is an effective method to accomplish high-peak workloads. Generally, unit costs have increased when outsourced. Maintaining quality through outsourcing can be challenging. It is critical to set up a systematic performance measurement system to perform objective, consistent reviews of appraisal work.
  - Our state has a large supply of qualified consultants to conduct appraisals, appraisal reviews, negotiations, and relocation assistance. Consultants lack expertise for preparing right-of-way maps. Based on data from the early 2000s, costs using consultants were slightly higher. However, the amount of time spent supervising and training consultants, as well as reviewing their work, did not really provide relief to the internal staff. As a result, the total cost was twice as much as if the state DOT had done the work internally.
  - In our district, in-house work usually costs less and is more accurate due to specialization in the type of appraisal problem requirements.
  - Initial proposals from consultants tend to be competitive. In some cases, contract modifications due to revisions, scheduling, and other factors drive costs up significantly. It is advisable to negotiate a time extension as opposed to a cost increase if possible.
  - Some increase in the number of condemnations. Condemnation costs have increased.
- Other:
  - Contracting issues are forcing small firms out of business while larger firms tend to get all the work. Assigning all the work to a few consultants defeats competitiveness and results in higher costs with lower quality.
  - Our district only outsources title search and some appraisal work. We do not outsource negotiations, acquisitions, or relocation assistance.
  - Current contracts provide for a poor incentive structure that encourages rapid parcel delivery versus accuracy and fairness.
  - When a company is selected to be in the pool (three-year contracts with annual renewal), part of the rating process includes reviewing and approving the resumes of all individuals. The state also has the ability to approve or deny any new hires. An in-depth knowledge of the firms and their staff enables the opportunity to select the right firm for a particular job. The cost is higher than using internal resources, but the result is usually quality service and on-time delivery. Outside agents interact with internal right-of-way staff to ensure timely project delivery.
  - Lack of eminent domain experience.

Performance Measures

Figure B-6 summarizes responses with respect to what performance measures should be in place to monitor the effectiveness of the real property acquisition process. The results are placed in a descending order by the total number of responses received for each type of performance measure state DOTs considered to be in place or needed. Overall, Figure B-6 indicates that state DOTs consider all the performance measures listed as being important (even the performance measure with the lowest number of responses, staff turnover rate, was selected by 59 participants). Nonetheless, the two most popular performance measures were number of parcels or real property interests to acquire and time to complete critical activities. Beyond these basic measures, state DOTs were particularly interested in measures such as difference between administrative settlement amount and approved appraisal, number of properties acquired by negotiation, number of properties acquired by condemnation proceedings, and number of properties acquired or in possession prior to letting.

Additional verbatim comments and suggestions provided by respondents included the following:

- Lead-time is often so short that it is not possible to interact with property owners and other stakeholders effectively and fairly. A tool to measure the quality of work compared to the cost of delivery in a compressed project development environment is needed. Costs have increased over the last 5 years due to the new way projects are delivered.
- Planned, allocated, and expended work versus resources. Related measures would include productivity indexes that take into consideration elements such as input/resources, output/services, quality, time, and ratio of direct to indirect (overhead) work and costs.
- Organizational effectiveness of having the right people in the right place at the right time.
- Even though performance measures (such as those shown in Figure B-6) are used for data comparison, reporting, and management, "performance" should not be a driver, particularly for measuring items such as staff turnover, budget,

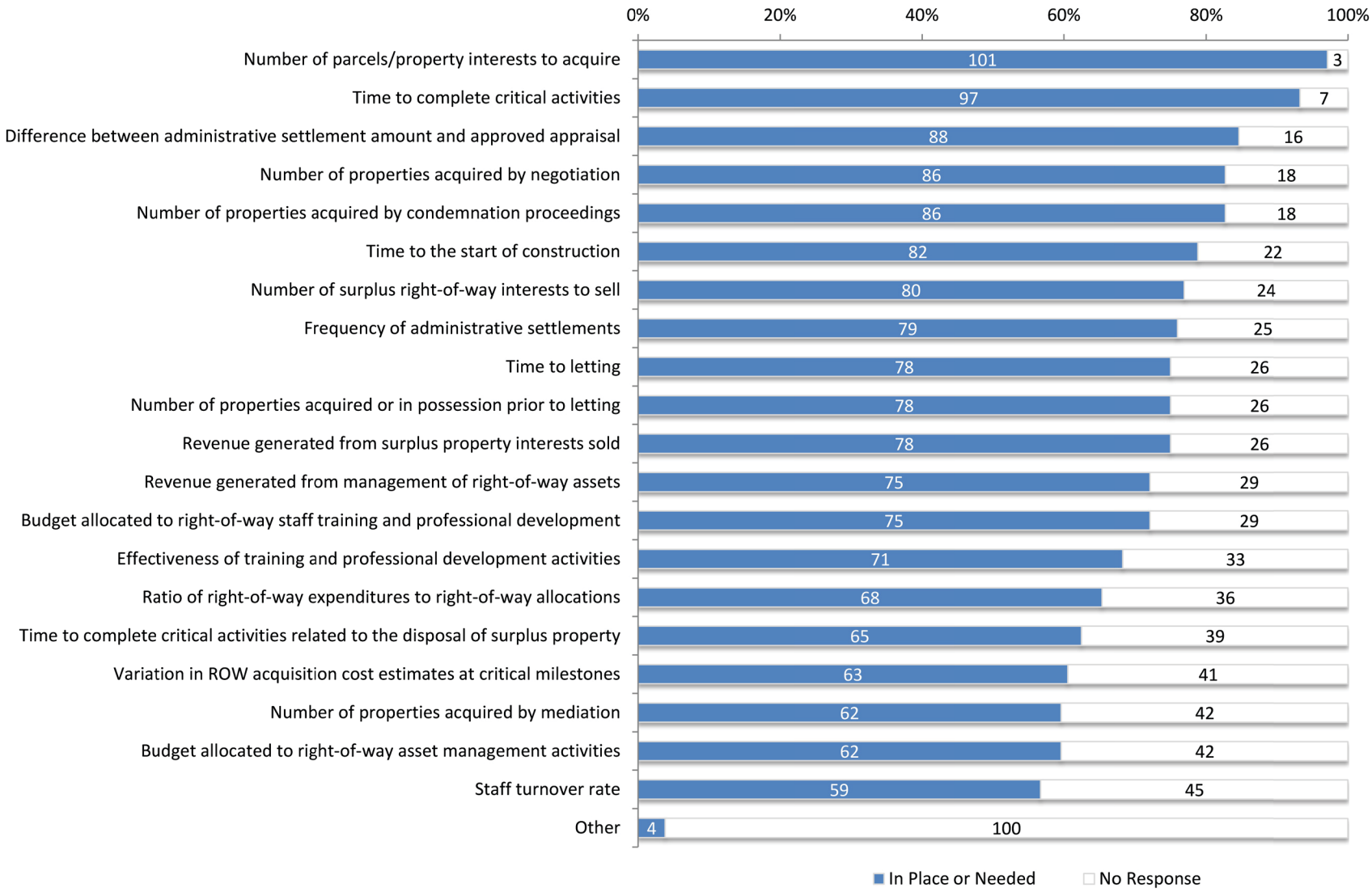


Figure B-6. Performance measures to monitor effectiveness of real property acquisition process.

and effectiveness of training. Because of staff shortages, imposing performance measures on overworked right-of-way agents would be unsuitable and unfair.

Changes in Laws and Regulations to Streamline Real Property Processes

Figure B-7 summarizes responses with respect to laws and regulations that state DOTs thought required urgent changes to streamline the real property acquisition process, more specifically, the Uniform Act and 49 CFR 24 (at the federal level) and laws and regulations (at the state level). In Figure B-7, each row represents the number of survey participants who thought it was urgent to change laws and regulations. For example, with respect to relocation assistance, the number of participants who indicated the need for urgent changes was 14 (Uniform Act), 10 (49 CFR 24), 9 (state law), and 12 (state regulations). It is worth noting that the online survey instrument was disseminated to stakeholders in 2011, i.e., before MAP-21 was signed into law in July 2012. As a result, the survey did not capture MAP-21 amendments to the Uniform Act and 49 CFR 24.

Overall, the response rate for the question about the urgency to change laws and regulations was very low. Even for the area with the highest number of responses overall (relocation assistance), the response rate was only around 11 percent. This trend could be an indication that participants (a) did not believe changing laws and/or regulations was urgent, or (b) may not have been familiar with specific provisions in the laws and regulations to the point that respondents could indicate with absolute certainty what (if any) urgent changes were needed. From the additional comments, ideas, and suggestions provided by participants, it appears a substantial number of participants did not believe there was an urgent need to change laws or regulations.

Condemnation proceedings ranked high compared to other topics when rows were sorted according to the total number of responses provided. However, as Figure B-7 shows, participants clearly indicated the need was in relation to state laws and regulations (23 and 15 responses, respectively), not the Uniform Act or 49 CFR 24 (3 and 2 responses, respectively). It is worth noting that although the Uniform Act and 49 CFR 24 mention condemnation proceedings, the reference is quite brief and not prescriptive, i.e., they do not describe in detail how to carry out condemnation proceedings. Likewise, some responses pointed to an urgent need for changes in the Uniform Act and 49 CFR 24 in relation to mediation before condemnation proceedings and property management. However, neither topic is covered in the Uniform Act or 49 CFR 24. (Note: 23 CFR 710 covers property management topics.) In any case, for both of these topics, the need for changes at the state level was considerably higher than at the federal level. For completeness, Figure B-8 shows the same responses as in Figure B-7, except that rows are sorted according to the total combined number of responses concerning the Uniform Act and 49 CFR 24.

A summary of additional verbatim feedback provided by respondents follows:

- Laws and regulations are efficient now. We continue to work at the administrative level to improve our data management.
- There is no need for "urgent" changes in laws or regulations. Real property acquisition problems have always been an inadequate design or right-of-way plans (<30 percent design stage) and not enough time to acquire the real property. Typically, the state legislature and design engineers establish the date when the project will be advertised for construction. The right-of-way office should have an input on the advertisement date.
- The current system works well if there is enough lead-time (16 months) to complete real property acquisitions. The issue is receiving the project limits in a timely manner and limiting changes in design that result in changes to the new real property being acquired.
- The department is pressured to accelerate the acquisition of real property so that the project can be certified and construction can start. The Uniform Act and existing state laws are designed to protect property owners. Amending these laws would speed up construction at the cost of great personal burden to property owners and a greater cost to the project.
- There is no need to change laws or regulations. Governmental agencies need to respect the right of property owners to receive just compensation for takings and to prove the public purpose need for the takings. Agencies can still be innovative and try new processes in completing real property acquisition processes in accordance with both federal and state laws.
- Streamlining should not equal loss of property rights and the right to due process. Appraising properties without the plans being complete is streamlining but does not allow for due process. We should work toward following the regulations we have and treating people fairly. To streamline the overall process, the process of getting a project ready for right-of-way authorization should be looked at as much as the real property acquisition process itself.

Respondents were also asked what specific changes would need to be introduced in laws and regulations to streamline real property processes. A summary of the feedback provided follows, grouped by major categories.

- Before the environmental document is approved:
  - 23 CFR 710 needs to be changed to allow for greater flexibility in federal spending on real property when the environmental process is not complete.

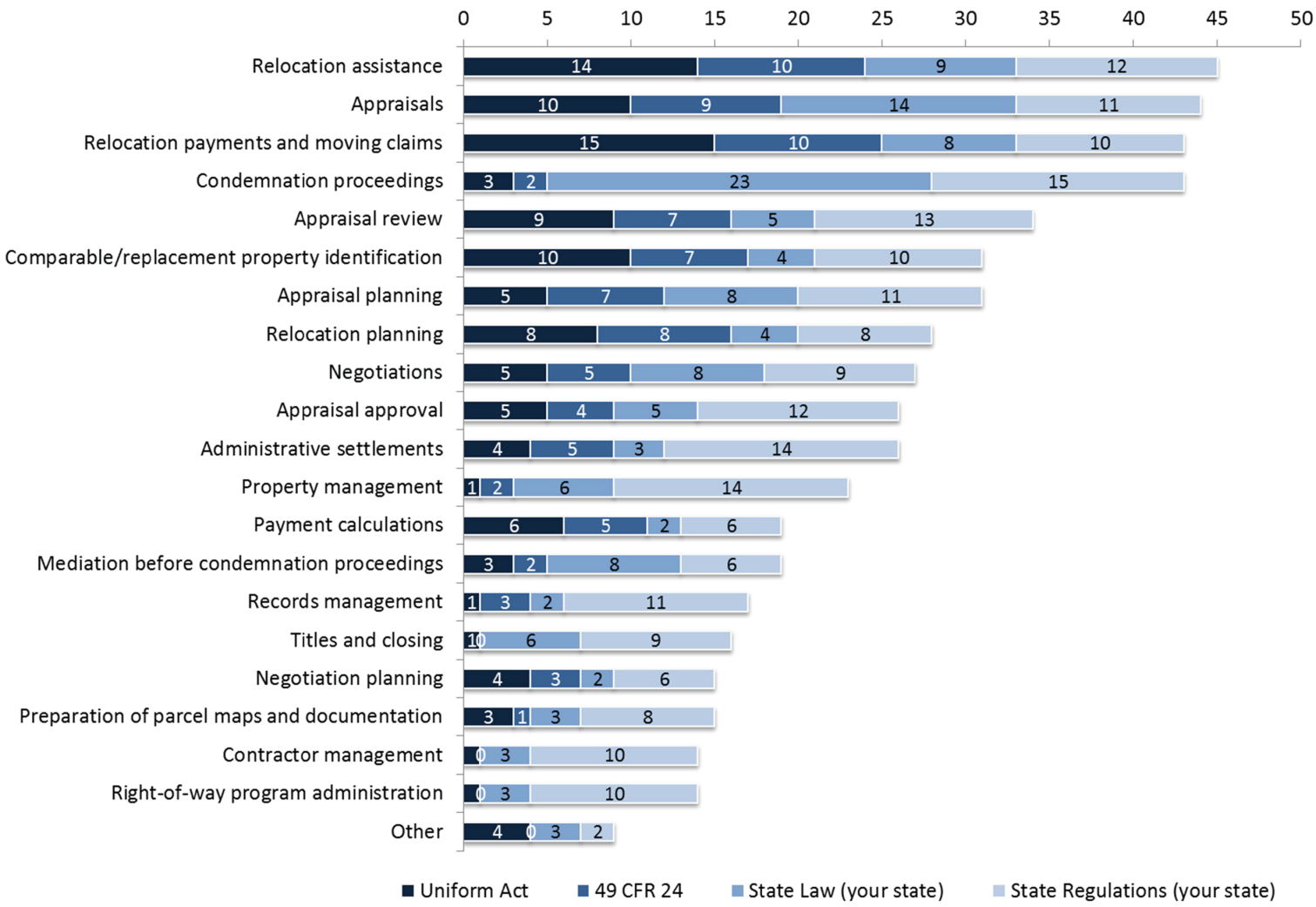


Figure B-7. Laws and/or regulations requiring urgent changes to streamline real property processes.

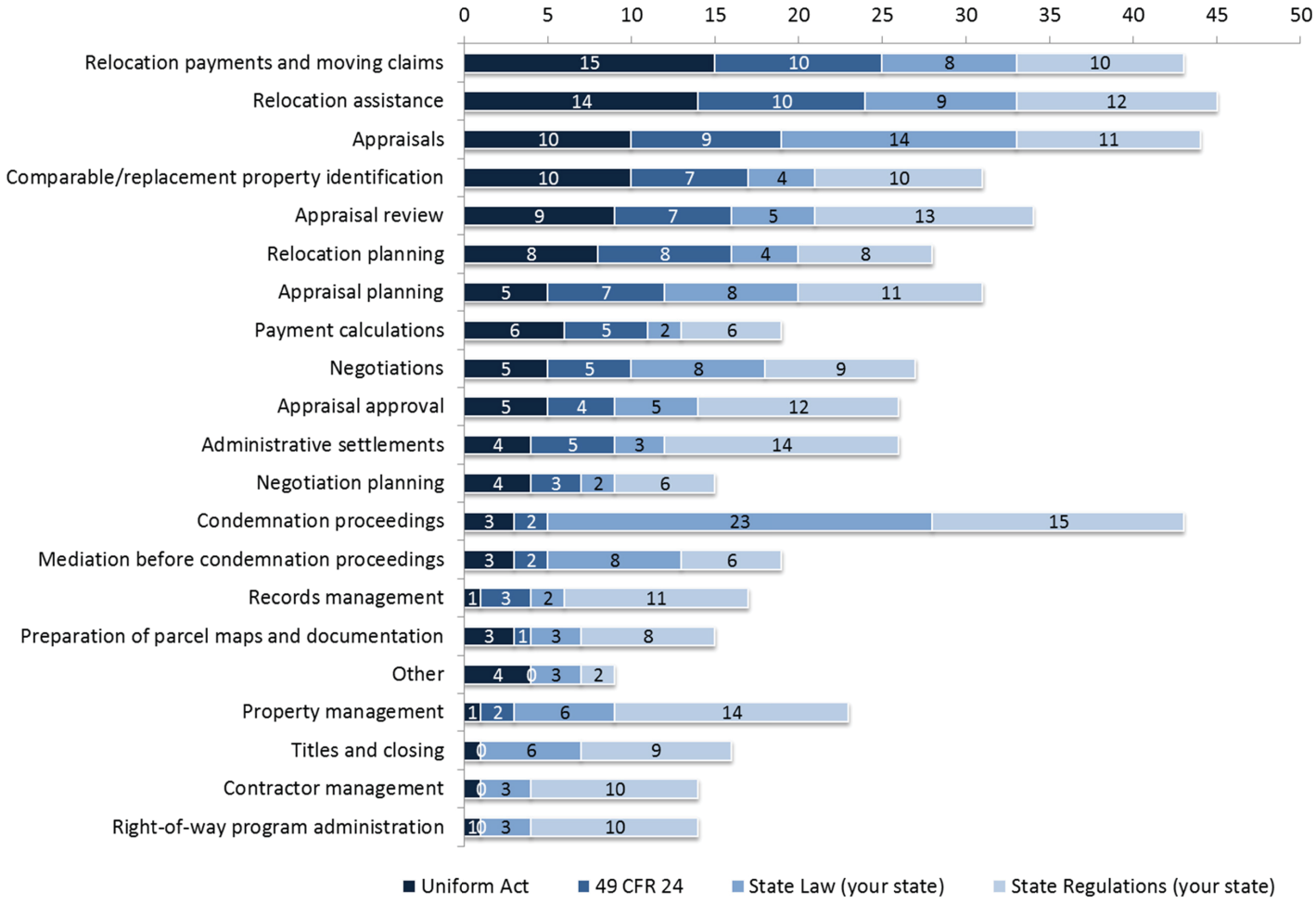


Figure B-8. Laws and/or regulations requiring urgent changes to streamline real property processes (sorted by total number by adding Uniform Act and 49 CFR 24).

  - It should be possible to start real property acquisition activities prior to the completion of the environmental process if the new real property is not anticipated to have negative environmental impacts.
- Appraisals and waiver valuations:
  - Minimum appraisal amounts need to be raised.
  - There is a need to increase the ability to exercise appraisal waivers for properties under $25,000.
  - Require outdoor advertising companies to share data with appraisers or default to a national valuation standard. Many appraisers have no idea how to appraise billboards. Outdoor advertising companies resist sharing data needed to produce a competent report.
  - Review appraisers are required for integrity, but there must be a better way that does not clog the system or rubber stamp inadequate and inconsistent appraisal practices.
- Negotiations:
  - There is a need for a law that requires property owners to negotiate in good faith during the direct purchase process. Property owners are frequently advised by attorneys not to negotiate with the agency with the expectation they will receive more money during condemnation.
  - There is a need for streamlined, consolidated procedures instead of 20 pages of directions for each type of settlement. In our agency, there is also a need for administrative support to assist with typing forms. Real estate personnel are not trained for this activity, and the result is many clerical errors in paperwork, which then need to be corrected at the district level and/or the central office, wasting valuable time.
  - There is a need to be able to perform negotiated universal settlements.
  - In our state, there is a need to eliminate the requirement for a 30-day "holding" period between reaching a purchase agreement and the actual closing.
  - Allowing condominium owner associations to represent and sign for all interested parties when the state DOT is acquiring condominium real property would substantially reduce or eliminate the need to obtain

individual signatures. The associations could manage this process for the benefit of all unit owners rather than the state DOT having to spend many months reaching each individual owner. Payments could be made to the association for disbursement to individual owners.

- Relocation:
  - Noncompliance with income and/or citizenship proof should clearly negate eligibility for any benefits and should trigger police powers to remove persons and personal property from the real property being acquired.
  - There is a need for the ability to pay for right-of-entry in the case of low-impact, low-value temporary easements.
  - In our state, there is a need to streamline relocation stage requirements so the plans can be developed with less staff time. The state code is much more specific than the U.S. code and needs to be revised and updated.
  - Raise the $10,000 limit on the reestablishment expense payment for business relocations.
  - Relocation benefits for businesses need to be expanded and improved to encourage businesses to reestablish locally instead of moving to other cities, states, or nations. The relocation program needs to be turned into a "jobs creator" instead of a "jobs killer." This program also needs to be simplified to expedite payments and facilitate relocating people and businesses. There is also a need to eliminate any "going-out-of-business" payments and encourage the reestablishment of businesses with larger reestablishment payments.
  - In our state, there is a need to increase the amounts for relocation and court costs available to property owners and business owners, given the long-term implications for those affected with the relocation.
  - Owners and/or occupants of residential dwellings are fairly compensated and receive adequate relocation benefits. However, small business owners do not receive the same level of benefits. We have tried to enact legislation to increase payments, but have not been successful. The Uniform Act needs to be amended to increase benefits.
- Condemnation:
  - During mediation, when the state raises its offer, the new offer should become the new highest written offer used to calculate the 15% fees.
  - There should be a mandatory mediation period before a property acquisition can proceed to condemnation. In our state, many cases are resolved faster (compared to waiting for the trial date) through the use of the mediation tool.
  - There is a need for a law that limits the time spent on a condemnation action. The longer a condemnation action is unsettled, the more interest is earned on the outstanding settlement.
  - In our state, there is a need to revise the statute that an appraisal must be performed before starting condemnation actions. The change should be to perform a valuation (thus in alignment with the Code of Federal Regulations). There is also a need to change the eligibility for attorney fees.
  - There needs to be a uniform appraisal standard for condemnation that must be followed by all entities with the power of eminent domain as well as expert witnesses on both sides. The result will be more uniform court decisions and more uniform appraisal scoping and reporting for eminent domain, which will reduce costs associated with trial preparation for every potential use instead of the most probable uses.
  - In our state, there is a need to update the expropriation act regarding timeframes for filing actions and interest on decisions.
  - In our state, it is currently necessary to conduct two levels of review prior to the initiation of condemnation actions. This requirement adds several months to the process.
  - There is a need to reduce lead times for court procedures in condemnation cases and to hold property owners accountable for missed field meetings as these meetings require significant preparation and lead-time.
  - Our state law requires the state to be responsible for virtually all expenses incurred by both state and the property owner during condemnation proceedings. This situation makes it difficult to settle out of court and increases costs because there is no incentive for a property owner to negotiate.
  - There is a need to reduce the legal interest accruing on condemnation claims (currently 8 percent per year).
  - There is a need for a change in the way attorneys are appointed to handle the legal aspects of a project. In our state, attorneys are appointed by the governor and the attorney general. Unfortunately, appointments cause delays and additional costs due to inexperience in eminent domain law by the appointed attorney.
- Other:
  - Changes are needed in the area of certifications.
  - There is a need for more flexibility in certifying projects as well as better definitions regarding design-build project certifications.
  - In our state, the state DOT should become the lead agency, with all other state and local agencies adopting the state DOT policies as a guideline. The state already has training and certification requirements in its budget prior to providing federal aid to others.
  - When the development portion of a project is state-funded, it is possible to reduce the project development cycle by completing many activities simultaneously (while following the Uniform Act). However, when federal dollars are used for development, activities are carried out more sequentially, slowing down the delivery.

- The 2005 changes to 49 CFR 24 have not been implemented in our state in either statutes or administrative code, resulting in conflict between federal and state requirements.
- In our state, there is a need to implement civil service changes to support enhanced staff expertise capabilities. This is partly due to a lack of recognition of required real property skill sets.
- Possession-and-use agreement interest rate needs to be lowered from its current 12%, thereby reducing the number of condemnations.
- The state needs to have the ability to keep funds from the sale of surplus properties and conduct minimal improvements to maximize the value of the property.
- In our state, it is currently required to have paper copies of a wide range of documents, such as summary reviews, appraisal reviews, and so on. This is unnecessary.
- There is a need to contract out title and closing work.
- There is a need to remove the requirement for transportation commission approval before selling or conveying surplus parcels. In certain surplus property situations, it would also be advisable to relax the requirement for a "fair market value."

Business Practices

Participants were asked what business practices at their agency (whether or not required by current laws or regulations) would likely result in significant streamlining of real property processes. A total of 52 participants provided feedback. A summary of this feedback follows, grouped by major categories.

- Internal coordination:
  - Coordinate with right-of-way personnel to avoid changes in the project design before property acquisition activities start.
  - Make sure that design personnel completely identify and finalize the project construction limits 18 months before the project letting date.
  - Involve right-of-way and utility coordination personnel earlier in the process.
  - Release right-of-way funding as early as possible.
  - More effective communications with other agency units before construction starts.
  - Keep right-of-way staff involved in the development process of all projects regardless of size.
  - Conduct regular project meetings to track the progress in the acquisition of parcels.
  - In our state, real property acquisition and property management are two separate units. There is a need to merge the units or improve information sharing.
  - Conduct meetings with officials from other districts or regions at least once a year to ensure consistency of practices throughout the state.
- Appraisals and waiver valuations:
  - Implement administrative reviews on appraisals instead of (or before) full technical reviews. An administrative review could still result in a full technical review of the appraisal in question if warranted.
  - Raise the limit on appraisal waivers.
  - Raise the waiver valuation threshold.
  - Consider accepting certain low-impact business risks; for example, simplify legal descriptions for acquisitions less than $10,000, allow districts to establish just compensation for acquisitions less than $10,000, and allow a district manager to issue checks to property owners for low-value acquisitions (e.g., < $1,000). For properties that are already on the market, allow the agency to certify the value and make a written offer based on an evaluation of the asking price.
- External coordination and negotiations:
  - For off-premise billboards, amortize out nonconforming billboards, treat signs as personal property, and condemn the leasehold interest as part of the entire parcel.
  - Provide better mechanisms for acquiring railroad and pipeline property.
  - Provide better mechanisms for utility owners to move their facilities expeditiously at their own cost.
  - Pay for utility relocations as part of the project cost (for certain projects). The utility facility must be relocated prior to the construction letting or as part of the state contract. Paying for utility relocations as part of the project cost has resulted in more cooperation from utility owners for the submission of plans and estimates. Another benefit has been a reduction in the number of construction delays due to utility conflicts.
  - Provide better mechanisms for working with GSA in acquiring surplus federal lands and better mechanisms for acquiring land held in trust for Indian tribes by the Department of the Interior.
  - Make all federal agencies honor agreements and not cancel projects after the project has been federally approved and the real property has been acquired.
  - Remove the requirement for a real estate license to conduct negotiations.
  - Hold grantors accountable for project delays or increased costs when they fail to appear at critical meetings.
- Staffing:
  - Implement more equitable pay levels to attract more qualified right-of-way professionals and support staff.
  - Hire real estate managers and supervisors who have eminent domain experience.

  - Become more aware and informed of the multiple positions and roles within the division.
  - Procure appraisal and appraisal review services through a method other than a low-bid process.
  - Use on-call consultants, which reduces the need for more frequent consultant bid and selection cycles.
- Use of technology:
  - Improve the accuracy in the calculation of property areas by design engineers. Errors in the calculation of property areas are the cause of many revisions, which delay the appraisal process.
  - Implement a comprehensive, geospatial-enabled land management system.
  - The enterprise use of GIS and databases would be highly beneficial.
  - Develop visualization tools to illustrate the impacts of improvements to property and utility owners.
- Other:
  - Acquiring property for highway purposes should carry the ability to control or deny direct access to the highway as part of the property acquisition. There should be no separate evaluation of access rights.
  - Develop a procedure for low-risk, low-cost temporary easements in developed areas in situations when it is necessary to replace the existing sidewalk at the outer edge of the existing right-of-way.
  - Find a way for the state DOT to use the revenue generated by land sales.
  - Expedite the process to prepare a resolution of necessity prior to starting activities. The current process is time consuming, expensive, and repetitive.
  - Use federal funds to acquire real property prior to the environmental clearance.
  - Provide better right-of-way plans. Currently, there are numerous plan changes throughout the acquisition process.
  - Plan and develop projects within a reasonable period of time.
  - Move more approval authority to the local level.

Unique Processes

Participants were asked what unique processes existed at their agency in addition to the requirements in the Uniform Act, and what impact those processes had on their ability to manage the real property process effectively. A total of 44 participants provided feedback. A summary of this feedback follows, grouped by major categories.

- Improvements in efficiency—appraisals:
  - We scope the project with the appraiser and the reviewer. Parcel impact notes are completed before the scope, and all issues are documented at that time. The appraiser and the reviewer discuss issues before the appraisal is written. There is an open door policy between the appraiser and the reviewer at all times during the appraisal process to help lessen problems when the appraisal is reviewed.
  - We have a standardized appraisal form with descriptions of the information needed for each section. New agents report this is a great tool while they are in training. It gives them direction about where to seek information and allows them to work more independently.
  - We can use a cost estimate not based on a full appraisal, which is prepared by a licensed appraiser, to make offers on simple, small acquisitions under $20,000. This strategy has been very helpful. The owner is always given the option to have the property appraised.
- Improvements in efficiency—incentives and payments:
  - Incentive offers on certain corridors where costs and/or time savings are anticipated to result. The initial offer made to a property owner is based on an approved appraisal, but also has an amount added to the estimate of just compensation, which is based on a cost avoidance strategy. To ensure a net positive benefit it is necessary to compare projects that use the incentive offer against projects that do not.
  - Recent legislation provided additional compensation for residential and commercial properties where relocation is needed.
  - We allow a generous threshold for administrative settlements at the division level.
- Improvements in efficiency—other:
  - Giving regions full control, unlimited administrative settlement authority has proven extremely beneficial for project delivery. One of the results has been a very low condemnation rate (less than 5 percent of all acquisitions).
  - One-agent concept in which one right-of-way agent is the point of contact with the property owner for most aspects related to an acquisition, including appraisal, negotiations, and relocation assistance.
  - We have a senior right-of-way agent assigned to every transportation project. This agent is a member of the design team, attends public meetings, and ensures the project is cleared on time to meet bid date requirements. We also involve our FHWA realty specialist early when we know a problem exists that will require a conditional clearance or a federal land transfer.
  - Going green for a paperless environment (including recording, submitting, and tracking files and documents) has streamlined our process and made it more efficient and reliable.
  - The agent is required to complete an onsite inspection of comparable dwellings selected for each residential tract. The Uniform Act suggests that comparable dwellings are

available and examined. We go a step further and physically conduct an inspection.
  - The biggest single advantage is the power to use commissioner orders to administratively take land held by local agencies for transportation purposes.
- Inefficiency issues—appraisals:
  - Sharing appraisal with property owners has benefits but increases the time to complete appraisals and reviews.
  - A recent amendment to our state constitution has taken away some of our flexibility in using waiver valuations.
  - We can only assign 10 appraisals to an appraiser at a time. It is inefficient for the appraiser and the review process.
- Inefficiency issues—relocations:
  - In our state, the comparable replacement property law is more stringent than federal law for commercial property acquisitions. Unfortunately, the federal government has allowed pipeline operators to proceed under federal condemnation law and ignore state law.
  - State laws and regulations pertaining to low-income and illegal alien status cost money and slow the acquisition and relocation process.
  - We provide business replacement payments. We are also required to provide a comparable replacement business property, which takes significant staff time, particularly when there is litigation involved. However, because no two businesses are alike, a strategy to streamline this process would be to allow businesses to hire a firm under professional services to develop their replacement site, thus removing the requirement for the state DOT to provide a replacement site. This strategy would also free up staff time in the review and search for replacement sites.
- Inefficiency issues—other:
  - Due to money constraints, all decisions must be made at the highest levels creating scheduling problems.
  - In our organization, there are too many silos because of the level of specialization within the staff. The result is too many hand-offs and limited succession planning. More staff cross-training is necessary and change the process so that, for instance, one person or a group should be able to write legal descriptions.
  - Our outdoor advertising law is a nuisance and too complex. Any delay is satisfactory to advertising sign companies. There must be a better way.
  - Our state law requires selling surplus property at the appraised market value. It is not possible to sell at auction with a minimum bid of an amount below the market value. The result is no bidders when the market is not in an appreciation trend.
  - We are required to use a pre-selected list of attorneys for titles and closings rather than contracting these services. This process tends to delay closings.
  - Management of mineral interests is too complex.

Strategies and Innovative Approaches

Participants were asked what strategies or innovative approaches their agency had implemented or planned to implement to streamline the real property process. A total of 52 participants provided feedback. A summary of this feedback follows, grouped by major categories.

- Appraisals and waiver valuations:
  - Valuing non-complex, low-value properties using county assessment data instead of having an appraisal completed.
  - Use of $25,000 appraisal waivers.
  - Appraisal waivers for uncomplicated partial acquisitions (<$25,000) has somewhat streamlined the real property process. I would not advocate a higher dollar threshold for this type of acquisitions.
  - We are conducting a pilot on higher waiver of appraisal and conflict of interest levels.
- Incentives and payments:
  - Payment incentives for relocation and acquisition.
  - We have two FHWA-approved, project-specific, limited-term pilot studies for using financial incentives to vacate residential and business properties.
  - We had a pilot for relocation assistance incentives when the housing market was such that people were bidding to buy homes.
  - We had a recent change in legislation to allow $50,000 for business relocation reestablishments. We are currently using a $20,000 waiver for non-complex acquisitions.
  - Making offers by mail on uncomplicated tracts has had some success. Until recently (unfortunately funding stopped), we used to have a right-of-way seminar every year, and we invited LPAs and state DOT staff. Topics included changing regulations and areas that cause problems in the real property process.
  - On a pilot design-build project, we have used right-of-entry easements for a nominal dollar amount, which are offered to property owners after the official offers of compensation are made. The purpose is to gain immediate possession of the new real property while negotiations are proceeding. In our experience, most property owners do not object to the project, just the money being offered for the property, making it possible to proceed with the right-of-entry easements to allow the project to proceed while negotiations are being conducted.
- Use of technology:
  - Involvement in several FHWA initiatives, including the Every Day Count Initiative, peer exchanges, and visualization in real property. Other initiatives include developing a utility database and GIS interface and participation in NCHRP Project 08-55.
  - Computer programs for all real property functions.
  - Integrated right-of-way mapping systems.

  - Red line adjustments of appraisals: Minor appraisal adjustments in CAD-generated deed descriptions.
- Temporary easements:
  - Our state is implementing a streamlined process in situations that only involve temporary easements. This process allows a field agent to complete the acquisition with one face-to-face meeting. The initial contact is made by phone to review the land title and other property information. All remaining pre-acquisition activities are also completed prior to the first visit when the written offer is presented to the property owner.
  - We are implementing a temporary easement acquisition process.
- Other:
  - We are looking at getting our appraisers hired earlier in the process. On projects where the corridors are straightforward, we will be completing as many preliminary real property activities as possible before completing the environmental process (understanding that real property negotiations cannot proceed until the environmental document is completed and approved).
  - This agency has streamlined the development process by including representatives from all areas on the project team. That has caused the right-of-way group to streamline activities to ensure we meet project schedules.
  - One-agent appraise-acquire, draft purchase orders up to $10,000 (one-call process).
  - Development of relocation options available to displaced persons prior to making eligibility offers. It involves preliminary planning by using information learned at the interview with property owners prior to computations for replacement housing payments.
  - We piloted the NHI Business Relocation Course in our state in the last few years. We also put in place a process approved by FHWA to deal with negative equity situations for homeowners.
  - Decentralized signing authority, approval, and acceptance of acquisition documents.
  - In our state, we are currently going through a complete rewrite of our project development process guidelines.

Training and Professional Development

Participants were asked what kind of training and professional development the state DOT offers to staff members who work on real property activities. A total of 61 participants provided feedback. A summary of feedback provided by participants follows, grouped by major categories:

- In-house training:
  - We have a rigorous in-house training and participate in peer exchange meetings and programs. Outside trainers are frequently not familiar enough with laws and regulations in our state. These trainers need support within the state as an element of the training program ahead of time and at the presentation.
  - We offer multiple in-house training courses for agency staff, LPA staff, and consultants at a nominal fee. These courses are pre-approved for continuing education credits for real estate and appraisal licensing in our state. Low costs encourage agencies with small budgets to take advantage of the training. Low costs also attract many right-of-way professionals for continuing education credits.
  - In our state, we offer over 20 different classes in topics related to real property and utilities. All the classes were developed and are taught by state DOT staff.
  - Most of our training focuses on the appraisal process. We have two different training programs for new hires (a two-week academy and a one-week academy). Other training is offered when funding is available, which has been substantially reduced recently.
  - Our agency offers a wide range of training courses in real property, including titles, appraisals, appraisal reviews, acquisition, closings, property management, project management, and cost estimating. There are tiered courses within the various disciplines.
  - Our state offers formal training in every aspect of the real property acquisition and property management programs. State-certified appraisal and appraisal review courses are also conducted and offered simultaneously to state DOT and private fee appraisers. One-on-one, task-specific training is also conducted on an as-needed basis.
  - We have an approved real property educational program, which allows us to cross train employees. We also have a course on reading plans, which we use for all employees.
  - Our agency offers training in all real property areas. We would like to offer a basic overall class to be held yearly to accommodate new employees. Our agency also has a career path development program, which is a great tool for professional development.
  - We have a development program for new employees. At one time, our agency offered an annual workshop for right-of-way personnel, but it was discontinued.
  - Our state offers a considerable number of training opportunities, including project process, CAD, word processing, and automation. We also have an annual event for right-of-way professionals (approximately 1/3 state, 1/3 local agencies, and 1/3 consultants) that includes appraisers, engineers, attorneys, land surveyors, and so on. An annual survey technical workshop deals with topics such as CAD, files, and so on. We have also sponsored a limited number of employees pursuing their master's degrees.

  - We have an annual right-of-way conference for internal and external staff.
  - We have a relocation user group that meets twice a year. The meetings cover topics such as training, case studies, policy and procedural changes, and presentations on topics that are of interest to agents, such as current lending practices and problems, litigation, and home inspection problems. We also host teleconferences twice a year. Recently, we developed a course on basic residential relocation procedures.
  - We offer discipline-specific workshops on topics of current need. We also have a program whereby headquarters or regional staff go to other regions needing training and work on existing projects for mentoring on the job.
  - We offer in-house training sessions, technical user groups, and reimbursement for IRWA training sessions. We also have a centralized data bank for upcoming training sessions.
- External training:
  - FHWA webinars, which are useful to keep staff informed of current and innovative practices, could be used for real property activities.
  - Our agency offers a right-of-way certification program. Through one of the universities in the state, we offer a class on procedures for relocation assistance.
  - We offer classes through sources such as IRWA, NHI, FHWA, and local colleges. We encourage staff to take advantage of at least 1–3 training opportunities per year.
  - We get some IRWA classes usually taught by a trainer from out of state who is not familiar with our rules or regulations. Classes are also boring or not sufficiently interesting.
  - NHI courses, IRWA courses, and Appraisal Institute trainings.
  - We provide flexibility in relation to training needs for employees. We also provide tuition assistance and license renewal.
  - Our agency has a real estate services training coordinator. Classes and seminars include professional organizations, internal state DOT training, FHWA training, as well as individual training at the regional level.
- Other:
  - We need to offer training, but agents are short-staffed to do project work. There is no funding for outsourced training programs. Most project work is outsourced.
  - Most training and professional development is driven by sharing internal expertise. The current administration is cutting back on out-of-state travel to national programs.
  - In-house workshops are currently on hold, although the department has many new employees who would benefit from these workshops.

Property Management Practices

Involvement of survey participants in property management activities was quite significant (Figure B-9). Participation in what is traditionally considered property management (i.e., leases, disposal of surplus property, and disposition of improvements) was particularly strong. By comparison, participation in activities that are outside the traditional realm of property management (e.g., access management and permitting, financial assessments, and management of mineral rights) was relatively minor.

Figure B-10 summarizes the responses in relation to what kind of real property state DOTs acquire for transportation projects. Not surprisingly, most participants indicated their state DOTs acquire properties in fee simple for transportation projects. Frequently, state DOTs also acquire right-of-way access rights. Easements from a variety of stakeholders (such as private owners or LPAs) are also quite common. Much less frequently, although still common, is the acquisition of real property that excludes mineral, oil, or gas rights. Not very common is the use of leases for transportation projects.

Additional feedback provided by respondents indicates that state DOTs also use agreements with other agencies (e.g., federal agencies and tribal governments), as opposed to easements or acquisition in fee. Likewise, it is common to use leases and aerial easements with railroads.

Figure B-11 summarizes responses in relation to what kind of uses state DOTs allow on state property or right-of-way. In the figure, the darkest color represents an allowed use that also produces revenue for the state. The lightest *non-white* color represents a non-allowed use. The intermediate color represents an allowed use that does not produce revenue to the state. In Figure B-11, rows are sorted according to the combined number of responses associated with allowable uses (whether revenue generating or not). It is worth noting that sorting rows using a different category would produce drastically different graphs. For example, a graph that sorts rows by the number of responses associated with revenue-producing uses would show leases at the top of the graph.

As Figure B-11 shows, the most common use allowed is driveways, followed by utility installations and a variety of other uses (mainly leases). In the case of utilities, considering that utility installations are so prevalent along transportation corridors in the U.S., it was somewhat surprising that the number of responses regarding utility installations that are allowed on state right-of-way was not higher. However, this is not a fatal flaw. The reason is that many factors play a role in the decision to allow utility facilities on the state right-of-way, including type of utility, type of corridor, and type of installation (e.g., crossing versus longitudinal),

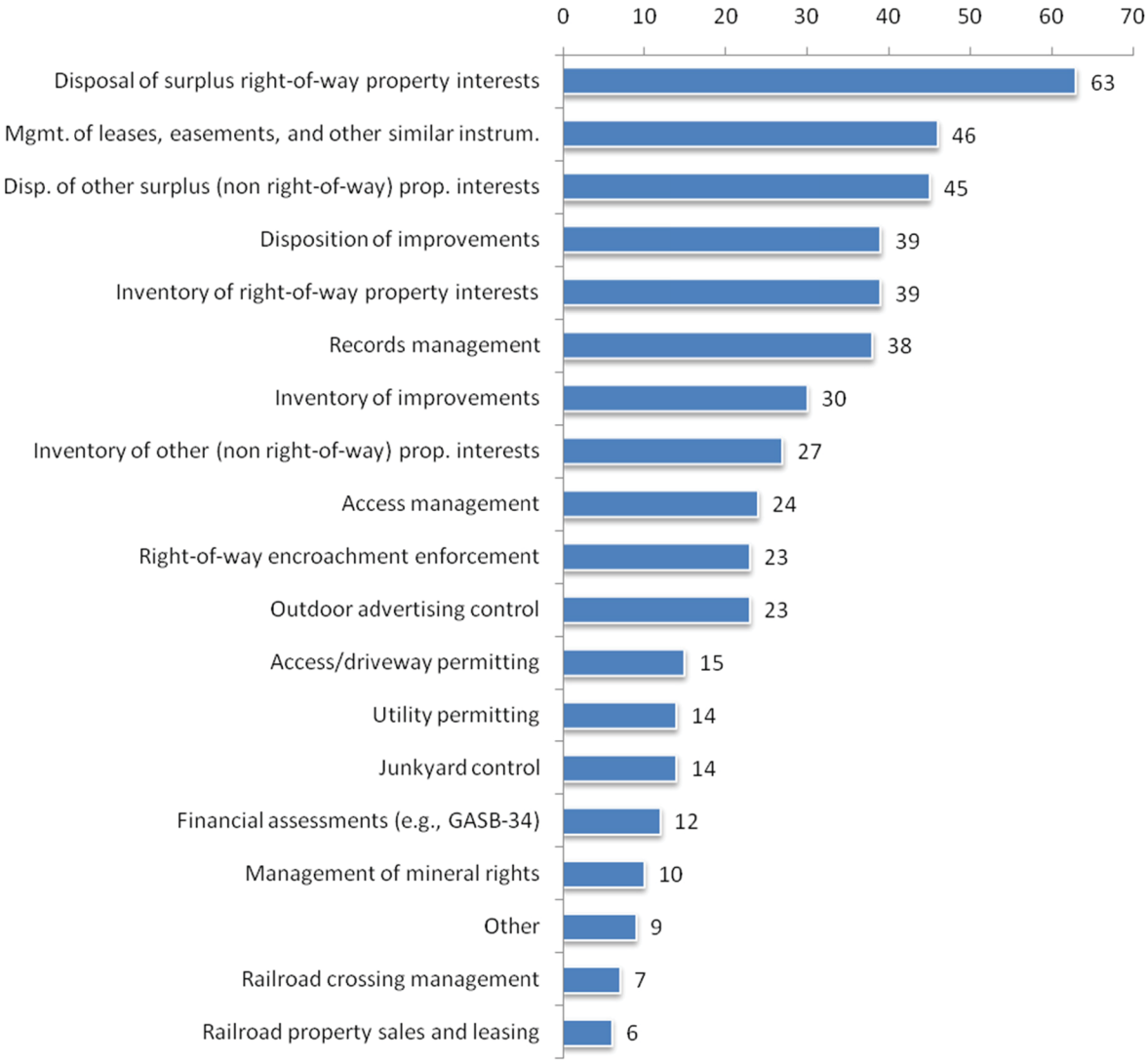


Figure B-9. Involvement of state DOT participants in property management.

defeating the purpose of attempting to categorize use by considering only two broad categories (i.e., allowed versus not allowed).

The number of responses regarding the use of outdoor advertising signs (revenue producing) on the right-of-way was surprising. According to the responses provided, the following states allow outdoor advertising signs (revenue-producing) within the right-of-way: California, Colorado, Florida, Mississippi, Nevada, New Jersey, New York, Ohio, Oklahoma, Rhode Island, Virginia, and Wisconsin. This information would need to be confirmed. One respondent clarified that outdoor advertising signs are allowed on non-active (i.e., excess) rights-of-way for legal settlement purposes only. Another respondent indicated the state has filed an application with FHWA to allow changeable message sign (CMS) advertisements on active rights-of-way and billboards at maintenance operation facilities.

A summary of additional comments and ideas provided by survey participants follows:

- All uses are reviewed on a case-by-case basis.
- Some uses are allowed both for revenue and non-revenue.
- Longitudinal utility facilities, with the exception of fiber optic lines, are not allowed on controlled-access or interstate highways.
- State law allows for the longitudinal installation of fiber optic lines on interstate highways. The companies would have to pay a yearly fee for this use.
- Sometimes utility installations are allowed longitudinally within the right-of-way.
- Longitudinal utilities are allowed on highways, but not within controlled-access freeways. In recent years, the state ended a new, but potentially profitable, longitudinal fiber leasing program. Access to the right-of-way is now free.

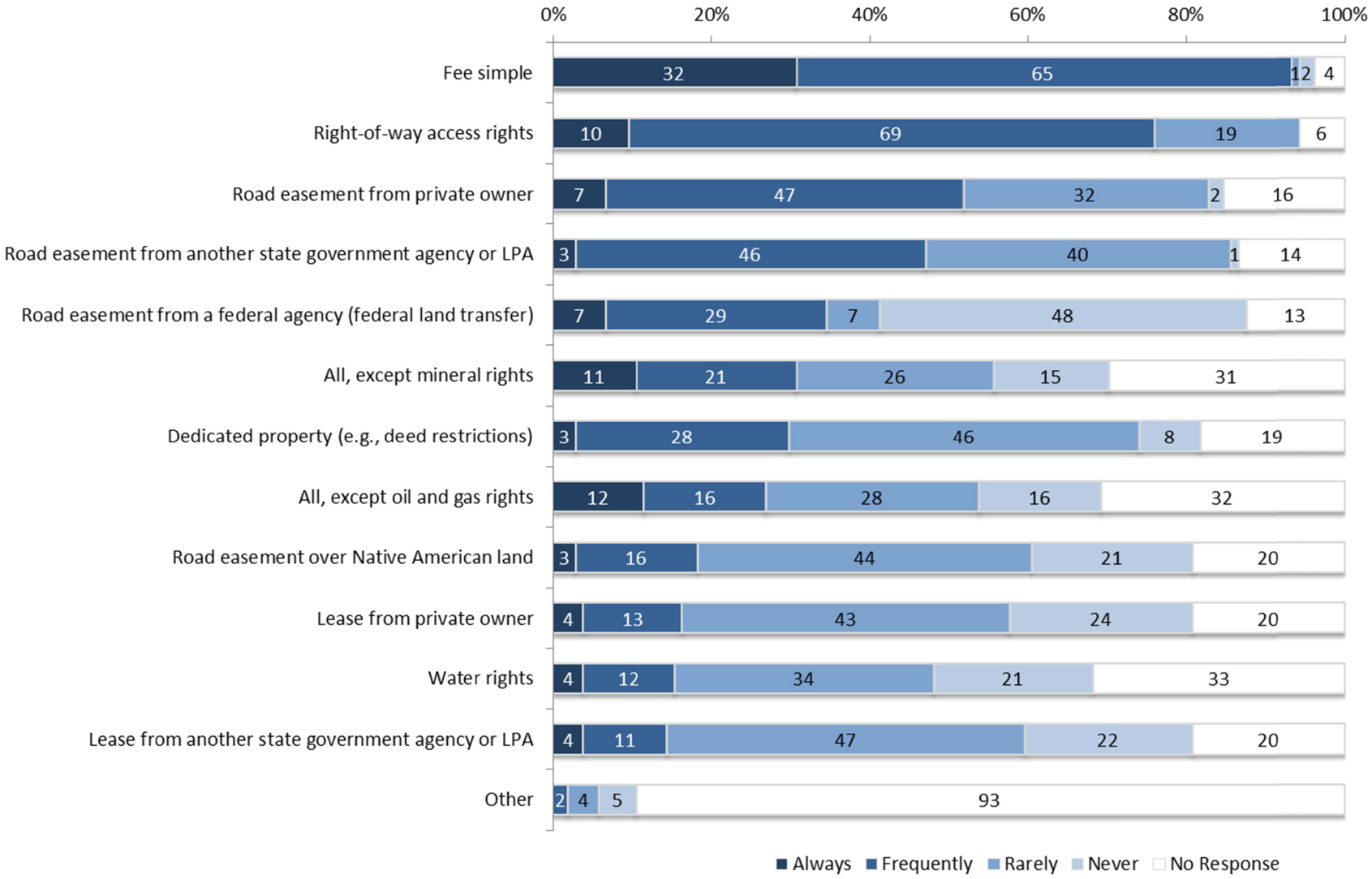


Figure B-10. Real property interests normally acquired for transportation projects.

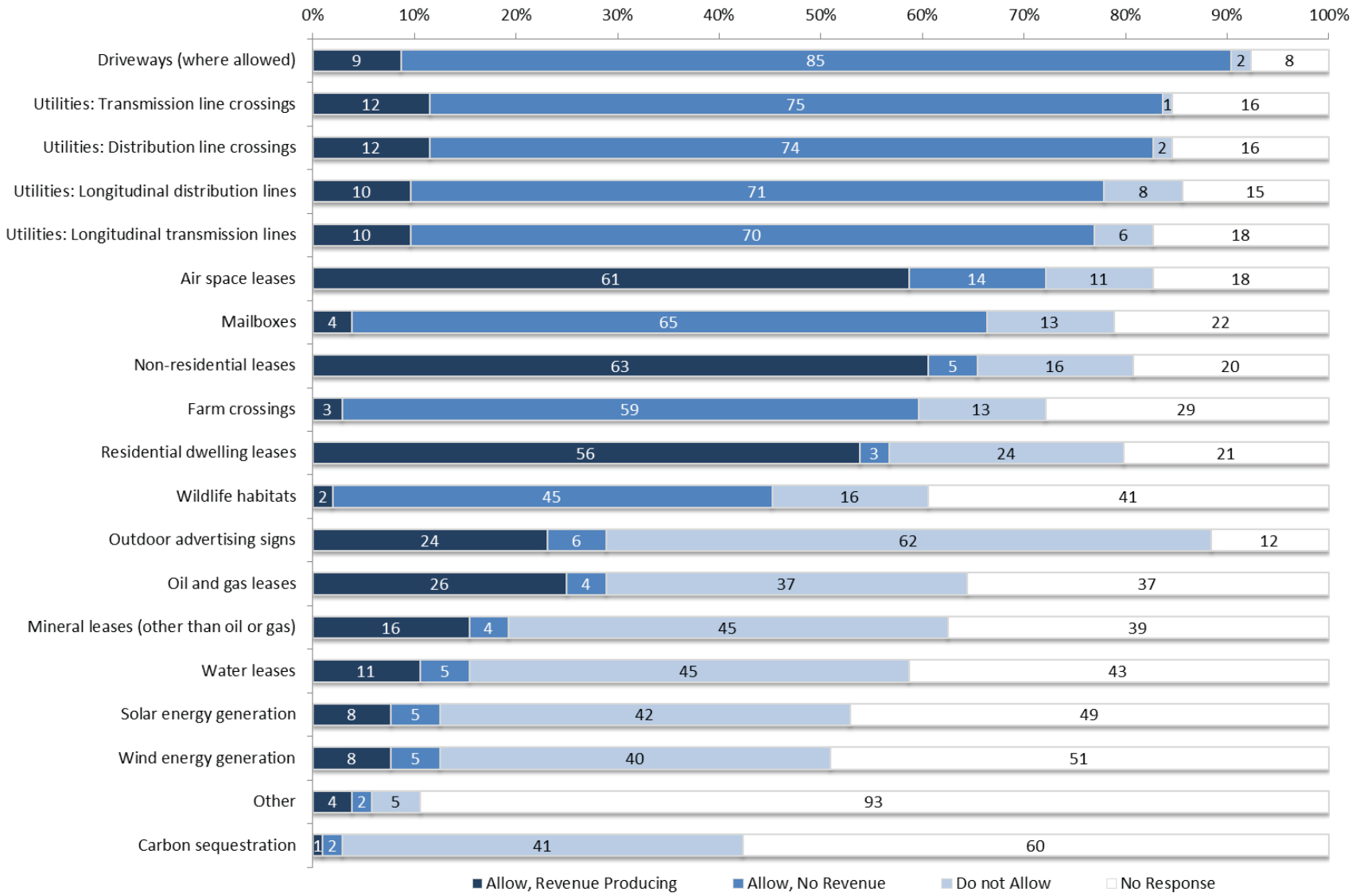


Figure B-11. Uses normally allowed on state property or right-of-way.

- The first solar lease in our state is currently under negotiations. We also consider wind generators. However, the only proposal reviewed so far was considered unacceptable on safety grounds.
- Our state is developing a solar energy generation policy (revenue generating) at this time.
- We have acquired right-of-way corridors where we have no money for construction. We use joint use agreements with the former property owners and allow them to use the property for agricultural purposes. We have been clearing improvements located in the acquired right-of-way for these future corridor projects.
- Our state submitted an application to FHWA to allow CMS advertisements within active right-of-way and billboards at maintenance operation facilities.
- Outdoor advertising signs are allowed on non-active (excess) right-of-way for legal settlement purposes only.
- Parking and other uses are allowed (non-revenue) by revocable occupancy permit.

Data Management Platforms

Figure B-12 summarizes responses in relation to the type of data management platforms that state DOTs use for property management purposes. In the figure, the darker the color, the more prevalent the use of a specific data management platform. In addition, rows are sorted by the cumulative number of responses regardless of intensity of use.

Overall, the results in Figure B-12 are not surprising. In general, office applications such as spreadsheets, word processors, and desktop databases are commonly used tools. Server-based databases are also common, reflecting a trend throughout the transportation industry, in which the use of this type of databases is increasing for a variety of applications. Legacy systems are not common (also reflecting a trend in the industry toward the replacement of this type of platform with more modern tools). The use of web-based mapping tools is common, reflecting the increasing acceptability of this type of platform to support a wide range of applications, including property management.

Although it was not surprising, it was nonetheless interesting to note that CAD and GIS platforms were not as commonly used for property management applications as other data management platforms.

Additional feedback provided by respondents consisted mainly of names of databases or systems their agency has implemented (or is implementing) to support a variety of real property functions, not just property management. A number of references in the literature provide documentation about these databases and systems.

Figure B-13 summarizes the responses in relation to the perceived level of impact of major issues that state DOTs face while conducting property management issues. In the figure, the darker the color means the higher the perception of impact. The impact scale is from 1 (least impact) to 5 (most impact). For convenience, rows are sorted by the frequency of responses when grouping the total number of responses associated with impact levels 3, 4, and 5. However, it is interesting to note that sorting rows by grouping responses associated with impact levels 4 and 5 would have produced a similar graph.

As Figure B-13 shows, more than 50 percent of participants indicated the highest impact was due to difficult-to-use databases or information systems documenting real property assets. This issue is consistent with the previous observation about the relatively poor levels of penetration of data management platforms such as CAD and GIS to support property management functions. Difficulty in tracking and monitoring the use of property and real property assets was also highlighted as having a significant impact. Participants also indicated that one of the most significant issues affecting a state DOT's ability to manage the state real property effectively was illegal or unauthorized encroachments.

Additional feedback from participants included a participant who highlighted that in the past, it was possible for officials to place holds on excess properties without justification. The result was properties with long-term holds that should have been sold as surplus properties. The state has now implemented a property retention review program that has aided in the disposal of excess properties and served as a mechanism for determining the reason and justification to keep other properties.

Results—Consultants

General Observations

Figure B-14 summarizes the distribution of consultants who participated in the survey according to their geographic range. Of the 24 participants, 12 participants (or 50 percent) operate at the national level, 7 participants (or 29 percent) operate at the regional level, and the remaining 5 participants (or 21 percent) operate at the state or local levels.

As in the case of the state DOT survey, most consultants who participated in the survey were primarily involved in the acquisition of real property (Figure B-15). In fact, the distribution of areas of involvement in the project development and delivery process for state DOT officials (Figure B-2) and consultants (Figure B-15) was very similar. Involvement in real property acquisition activities covered the entire spectrum, from appraisals to payments (Figure B-16).

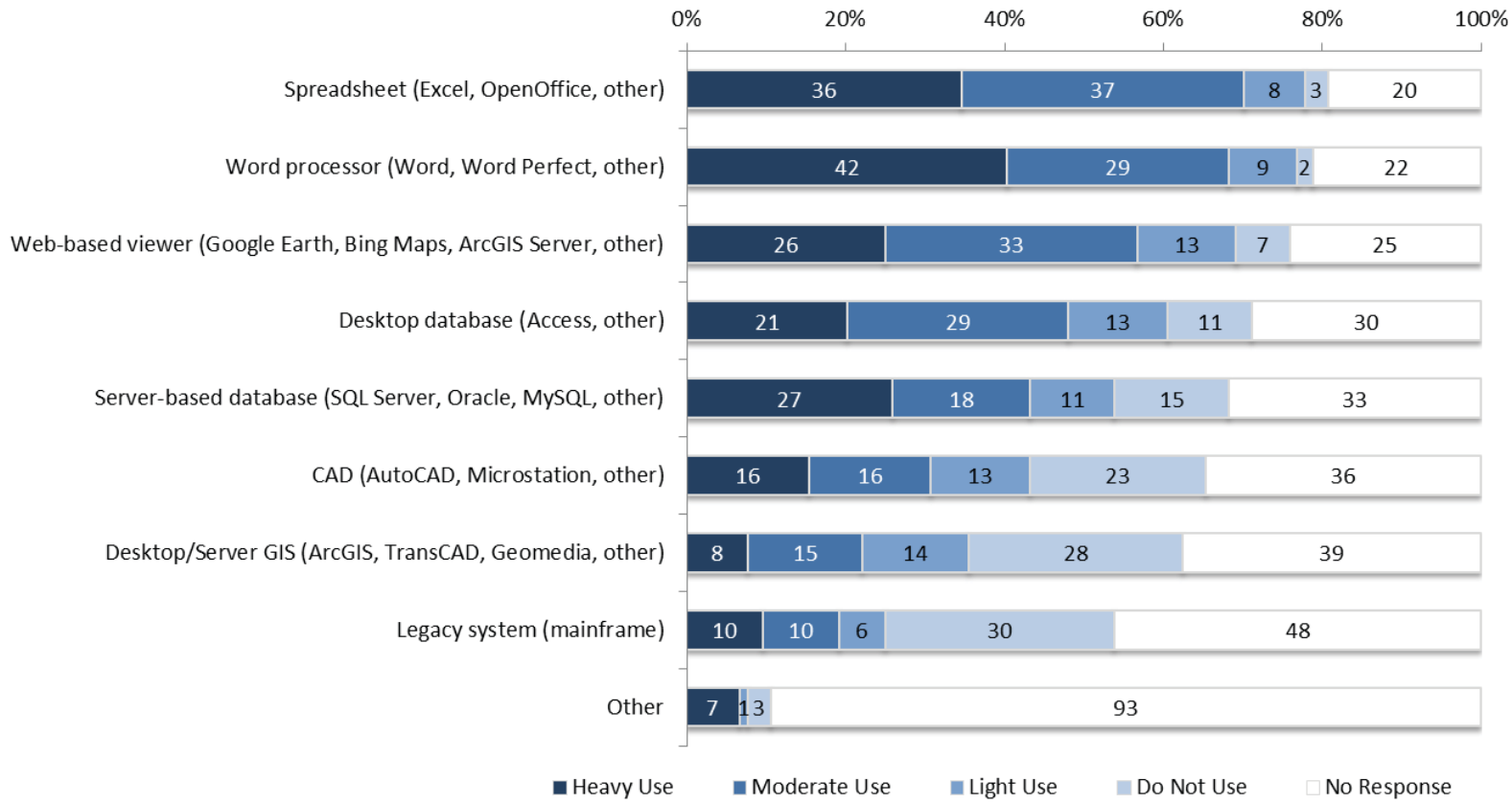


Figure B-12. Data management platforms used for property management purposes.

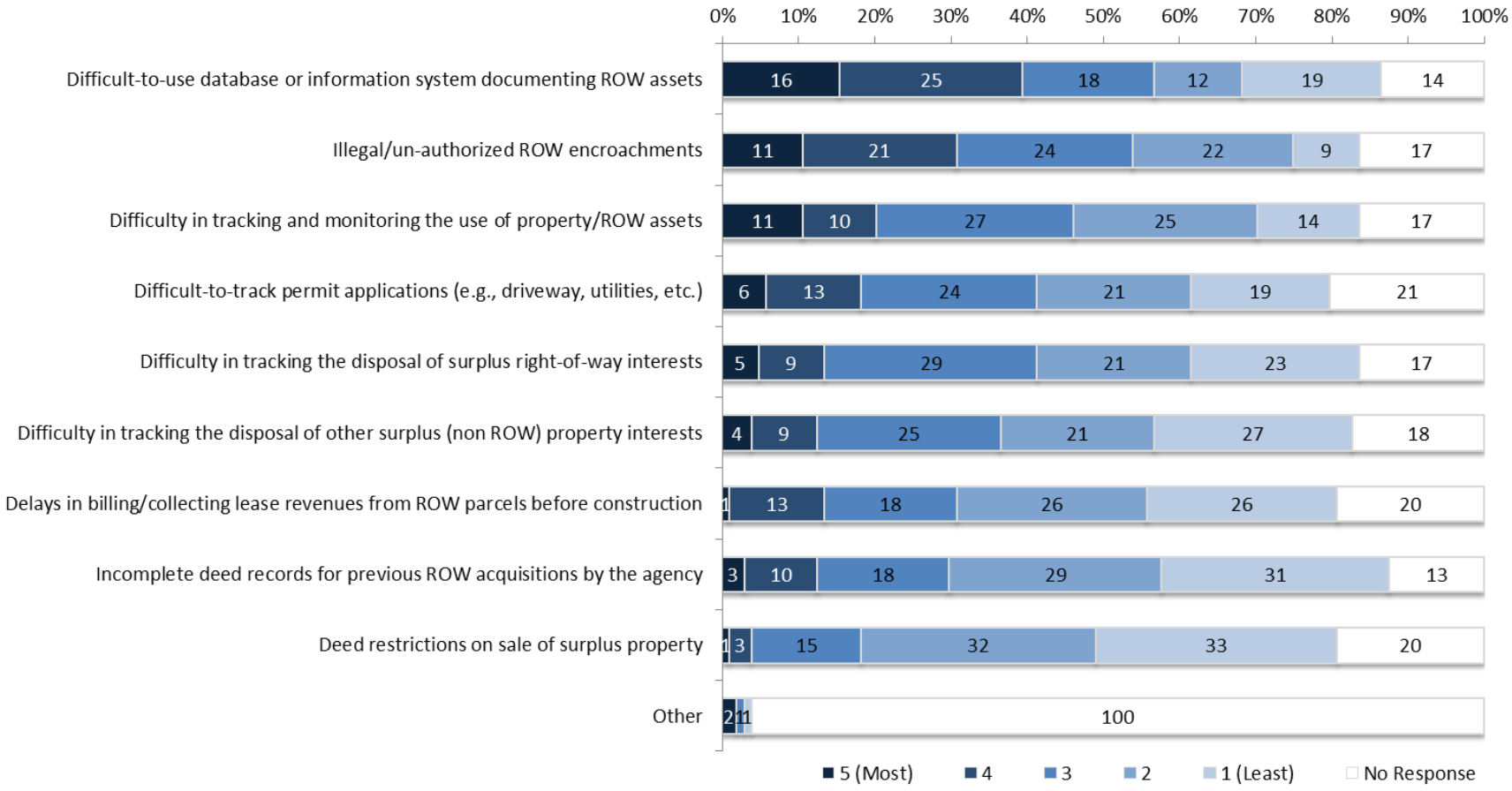


Figure B-13. Major property management issues at state DOTs.

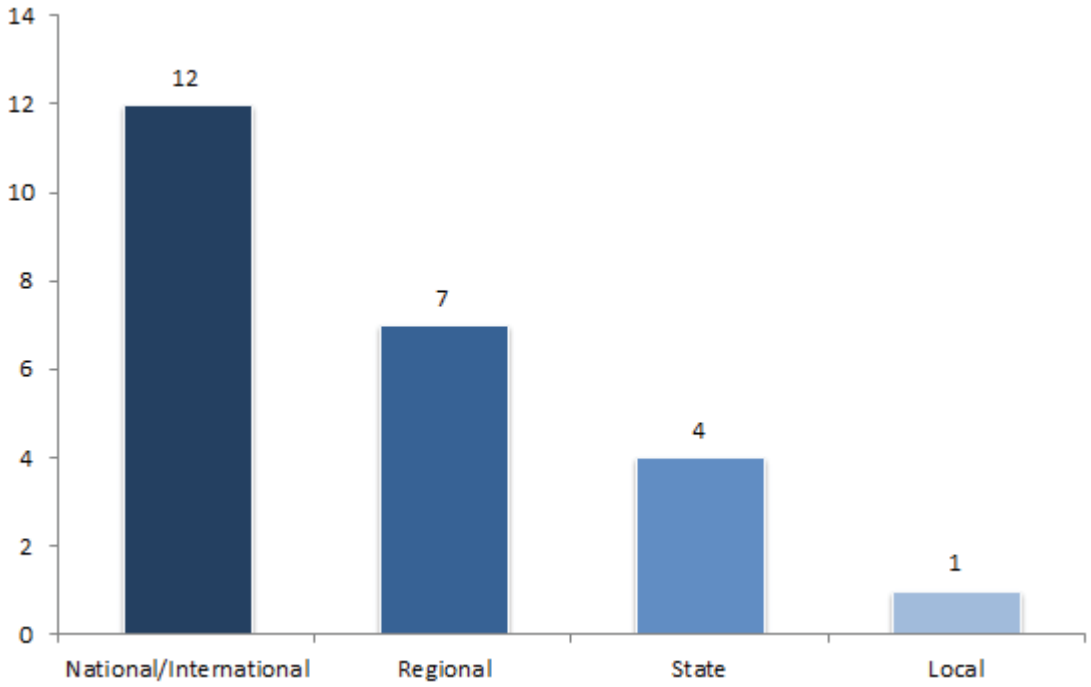


Figure B-14. Geographic range of consultant activities.

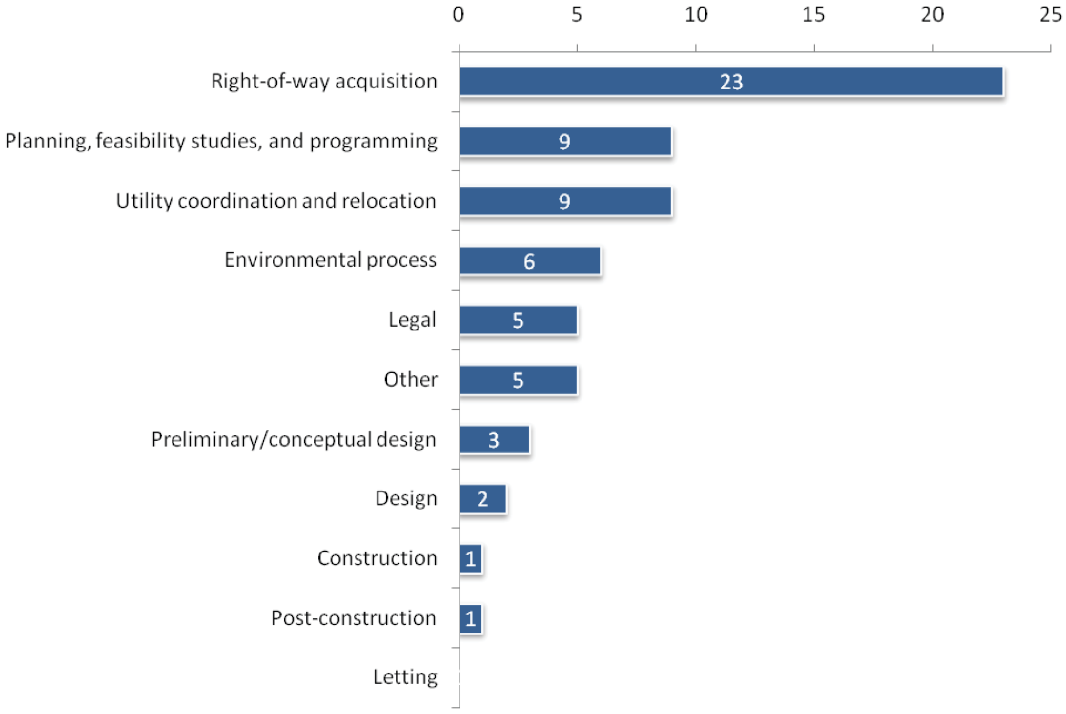


Figure B-15. Involvement of consultant participants in project development and delivery process activities.

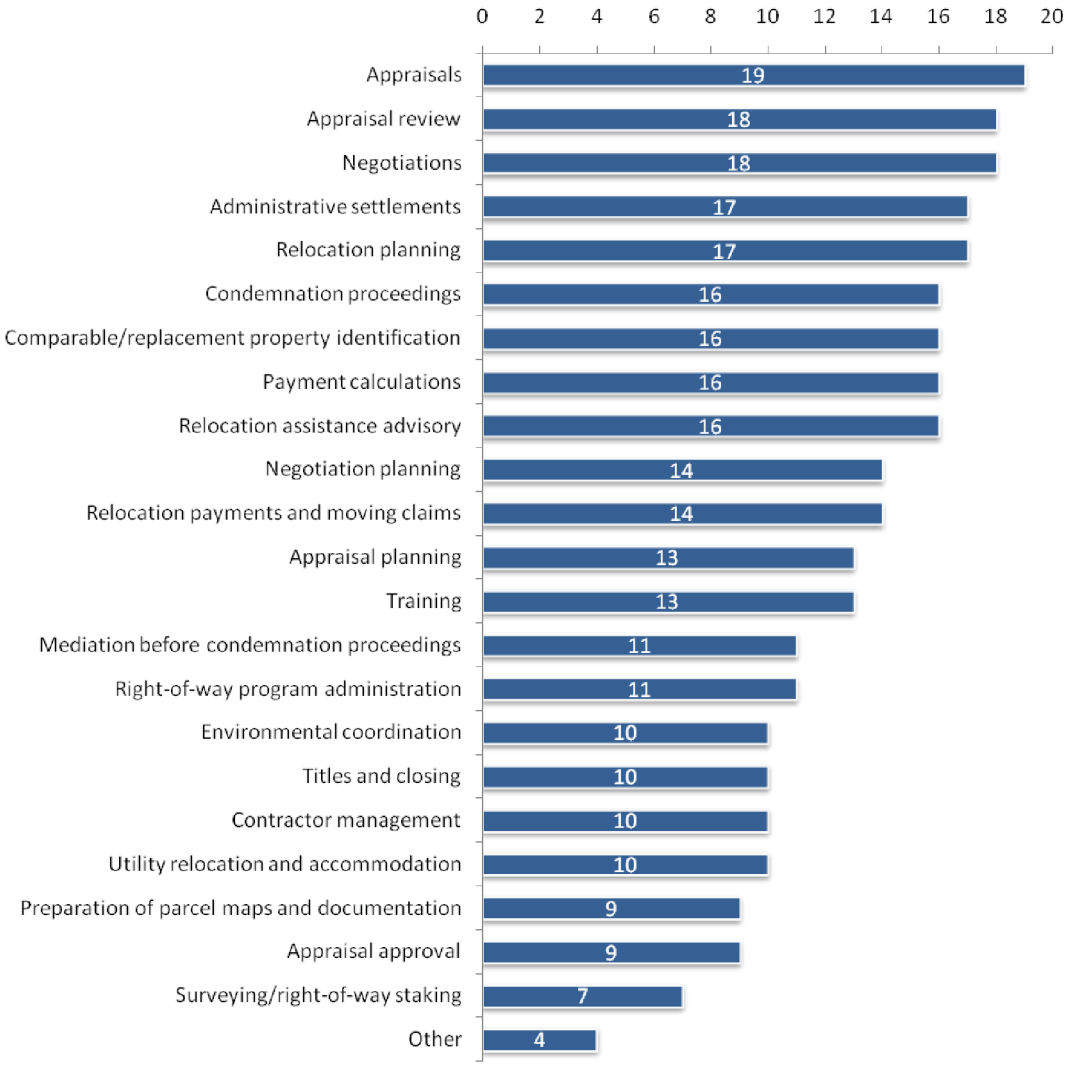


Figure B-16. Involvement of consultant participants in real property acquisition activities.

Issues and Challenges

Figure B-17 summarizes the responses in relation to the perceived level of impact of major issues that consultant clients face while acquiring real property for transportation projects. In the figure, the darker the color means the higher the perception of impact. The impact scale is from 1 (least impact) to 5 (most impact). For convenience, rows are sorted by the frequency of responses when grouping the total number of responses associated with impact levels 3, 4, and 5.

As Figure B-17 shows, almost 90 percent of participants indicated the highest impact was due to changes to parcels late in the design phase and due to lack of involvement of right-of-way staff during design. Not involving right-of-way personnel in earlier phases (planning and programming, preliminary design, and environmental process) as well as during utility coordination was also perceived as having a major impact.

A significant issue that resonated with survey participants was external entities (e.g., law firms advising property owners not to negotiate as a tactic to obtain more money during condemnation proceedings). The perceived level of impact of this issue was similar to the lack of involvement of right-of-way personnel during the design phase. Participants also thought that external entities advising property owners to divide their property into smaller parcels as a tactic to obtain more money from the state DOT was an important issue, although not as critical as advising property owners not to negotiate.

Overall, responses from consultants were similar to those expressed by state DOT participants. A major exception was staffing. Although state DOT respondents pointed to staffing issues as having a major impact, particularly with respect to staff turnover and lack of public-sector real property experience among consultants, consultants who participated in the survey ranked these issues much lower. However, both state

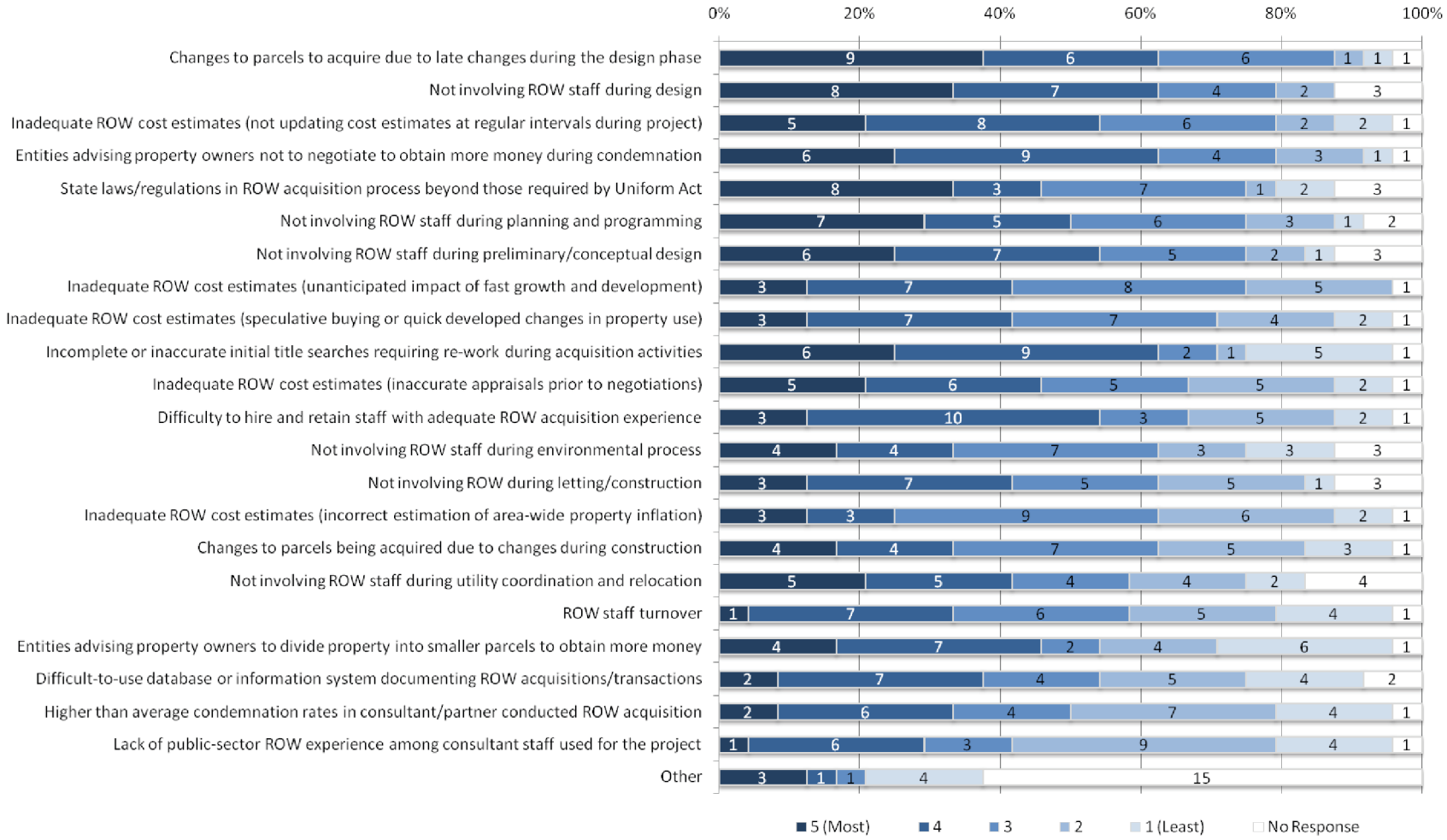


Figure B-17. Level of impact of major issues related to real property acquisition highlighted by consultants.

DOT officials and consultants indicated that difficulty to hire and retain staff with adequate real property acquisition experience was a critical issue.

Other issues identified by consultants as having an impact while acquiring real property for transportation projects included the following:

- It takes time for the state DOT decision-making process. There is also a lack of urgency when a problem occurs.
- Giving work to consultants who do their own "thing," do not understand the role of proper documentation in public work, and rush to get the job done rather than getting the job done right.
- State constitutions and statutes are providing more restrictions on taking as an overreaction to the Kelo Supreme Court decision on takings for private purposes. These restrictions result in additional costs if attorney fees must be paid. Inverse condemnations are increasing in some areas prior to agencies being prepared for the acquisition phase.

Figure B-18 provides a listing and classification of real property acquisitions that consultants consider particularly problematic (e.g., in terms of time and cost). As in the case of the state DOT survey (Figure B-5), colors provide an indication of a major real property acquisition phase or process (e.g., the darkest color means appraisal and the lightest color [white] means coordination with other stakeholders [e.g., LPAs]). However, color sequence does not imply a business process sequence.

In Figure B-18, rows are sorted by the total number of responses received for each type of acquisition that consultants considered particularly problematic. Overall, responses by consultants are very similar to those expressed by state DOT officials, particularly in relation to certain types of acquisitions (e.g., railroad interests—operating or abandoned—and outdoor advertising sign interests). There were some differences; for example, state DOT officials ranked non-residential, developed acquisitions higher than consultants did, but these differences did not appear to be major. A similar consideration would apply in the case of partial acquisitions, full acquisitions, and uneconomic remainders.

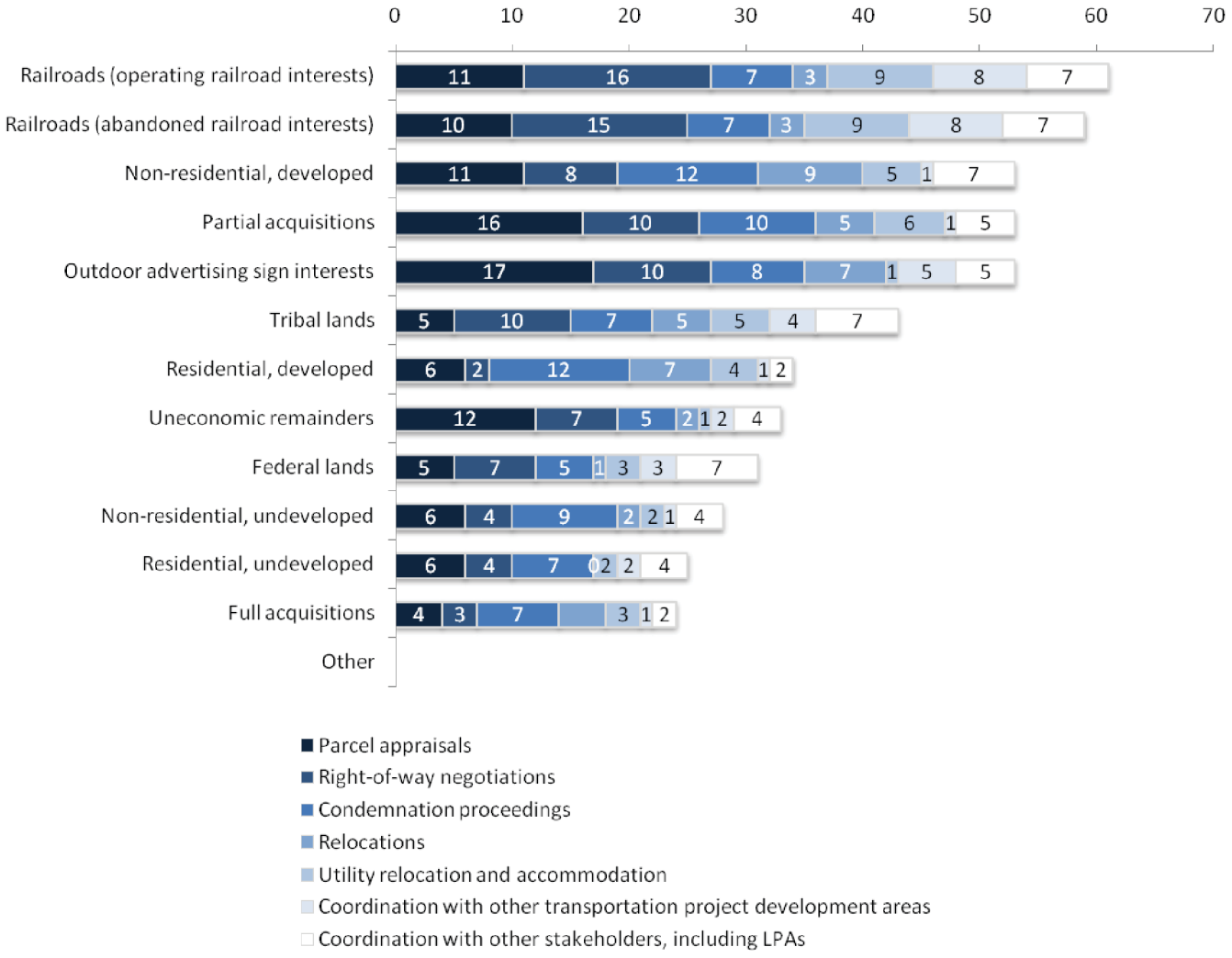


Figure B-18. Particularly problematic real property acquisitions according to consultants.

Additional comments that consultants provided included the following:

- Partial acquisitions resulting in residential and/or business displacements.
- Lack of utility relocation plans prior to initiating acquisition activities can result in late identification of residential and/or business displacements.
- The sheer size of a business and the time it takes to locate and contract a replacement site, as well as relocating the business with the least amount of impact to it. This process takes an incredible amount of time to plan and execute. Sometimes, project timelines do not consider this factor appropriately.
- Timeliness with any condemnation, occupied parcels, federal lands, and tribal lands.

Changes in Laws and Regulations to Streamline Real Property Processes

Figure B-19 summarizes the responses with respect to laws and regulations that consultants thought required urgent changes to streamline the real property acquisition process, more specifically, the Uniform Act and 49 CFR 24 (at the federal level) and laws and regulations (at the state level). In Figure B-19, each row represents the number of survey participants who thought it was urgent to change laws and regulations. For example, with respect to relocation payments, the number of participants who indicated the need for urgent changes was seven (Uniform Act), six (49 CFR 24), five (state law), and five (state regulations).

As in the case of the responses by state DOT officials (Figure B-7), consultants identified relocation payments and relocation assistance as areas in which changes are most urgently needed. Overall, the response rate for the question about the urgency to change laws and regulations was low. Even for the area with the highest number of responses overall (relocation payments), the overall response rate was around 24 percent.

There were also areas in which responses by consultants were different from those expressed by state DOT officials. For example, state DOT officials ranked appraisals much higher than consultants did. Conversely, consultants ranked real property program administration and preparation of parcel maps and documentation much higher than state DOT officials did. As in the case of the state DOT responses, consultants highlighted a need to change state laws and regulations in relation to condemnation proceedings. Interestingly, some consultants mentioned the need to change the Uniform Act and 49 CFR 24 in connection with mediation before condemnation proceedings, even though this topic is not covered in the Uniform Act or 49 CFR 24.

Additional feedback provided by consultants included the following:

- The regulations in our state should be rewritten to parallel the federal regulations. Now, we need to look at every area of relocation and decide whether federal rules or state rules are better for the displaced person.
- Low-value, non-complicated appraisals should not require a formal appraisal review. A qualified agency staff person or consultant should be able to conduct the review based upon his or her experience.
- Our state should offer to pay for landowner's appraisals (many states do) as long as the appraiser is pre-certified by the agency. Disclosure of sale prices would be helpful.
- Restrictions on appraisals contribute to the length of time required and inability to use waivers.
- Business relocation benefits are inadequate to address the financial impact created.
- Change the statutory $10,000 maximum reestablishment payment. This could be done by amending the Uniform Act or the state law. However, if changed by the latter, only entities with programs that use 23 CFR 710 (FHWA) may be reimbursed for any amount approved over $10,000. Currently, FTA grantees must pay any additional amount required by state law with local, non-matching funds.
- There should be a way to create a monetary hold to address environmental issues in a property. Currently, if a property has environmental issues, the only recourse an agency has is to go to trial.
- There is a need for a central point of contact with LPAs, as well as a central point of contact for feed payments.
- There is a need to move away from per-parcel fee contracts for real property services to professional services contracts.
- There is a need to mandate staff training before accepting real property acquisition results.
- There is a need to mandate coordination of land acquisition and relocation with the design and construction process to minimize public relations and political repercussions.
- There is a need for a global settlement option based on actual claims or appraisal estimates.
- The comparable dwelling methodology should be broadened to include the state schedule method.
- There is a need for more specific guidelines on income documentation requirements (for residential relocations), as well as a need to address loopholes involving persons who are not legally present in the U.S. (particularly in mixed household situations). There is a need to remove the 90-day occupancy requirement loophole.

Training and Professional Development

Participants were asked what kind of training and professional development consultants offer to their staff members

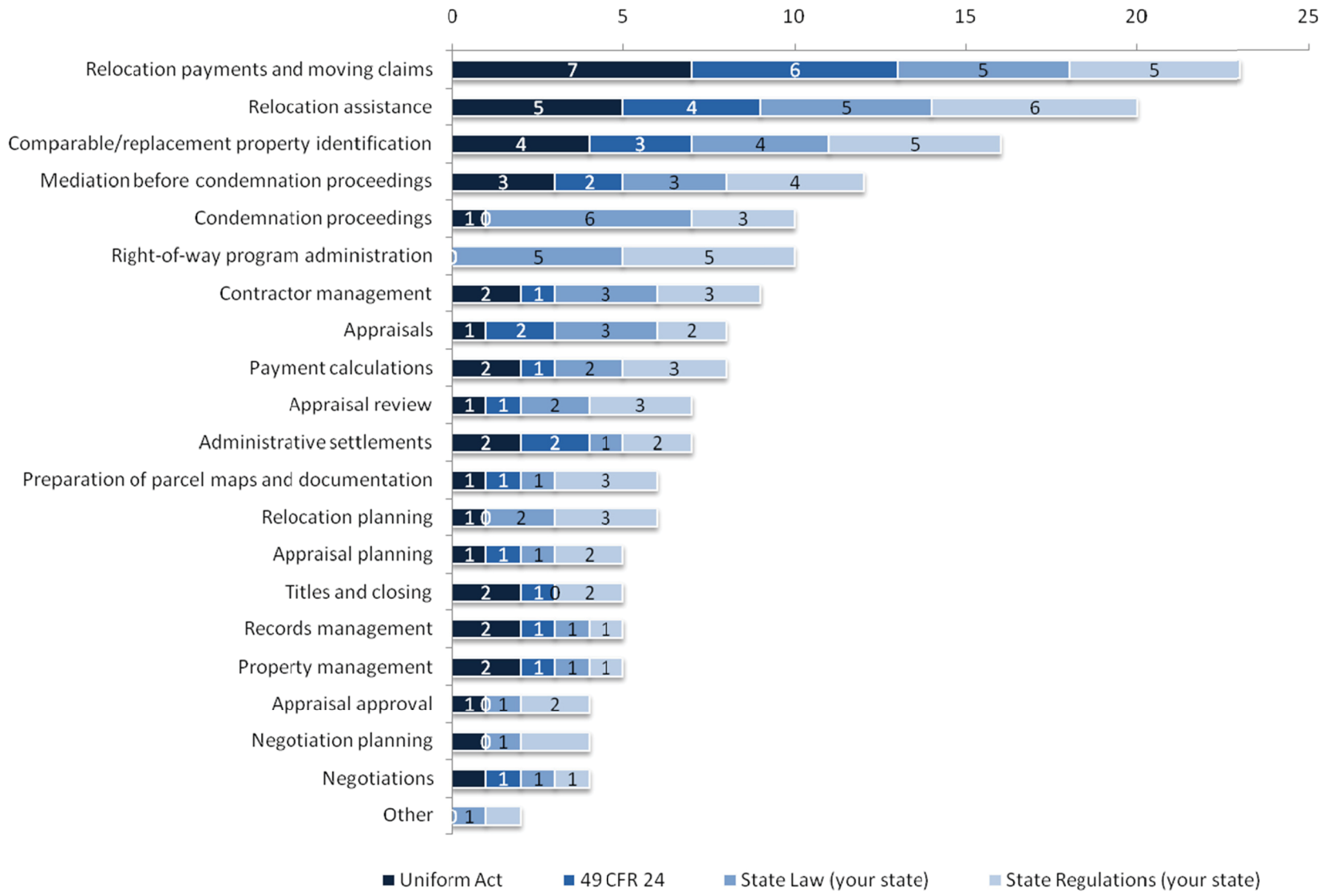


Figure B-19. Laws and/or regulations requiring urgent changes to streamline real property processes, according to consultants.

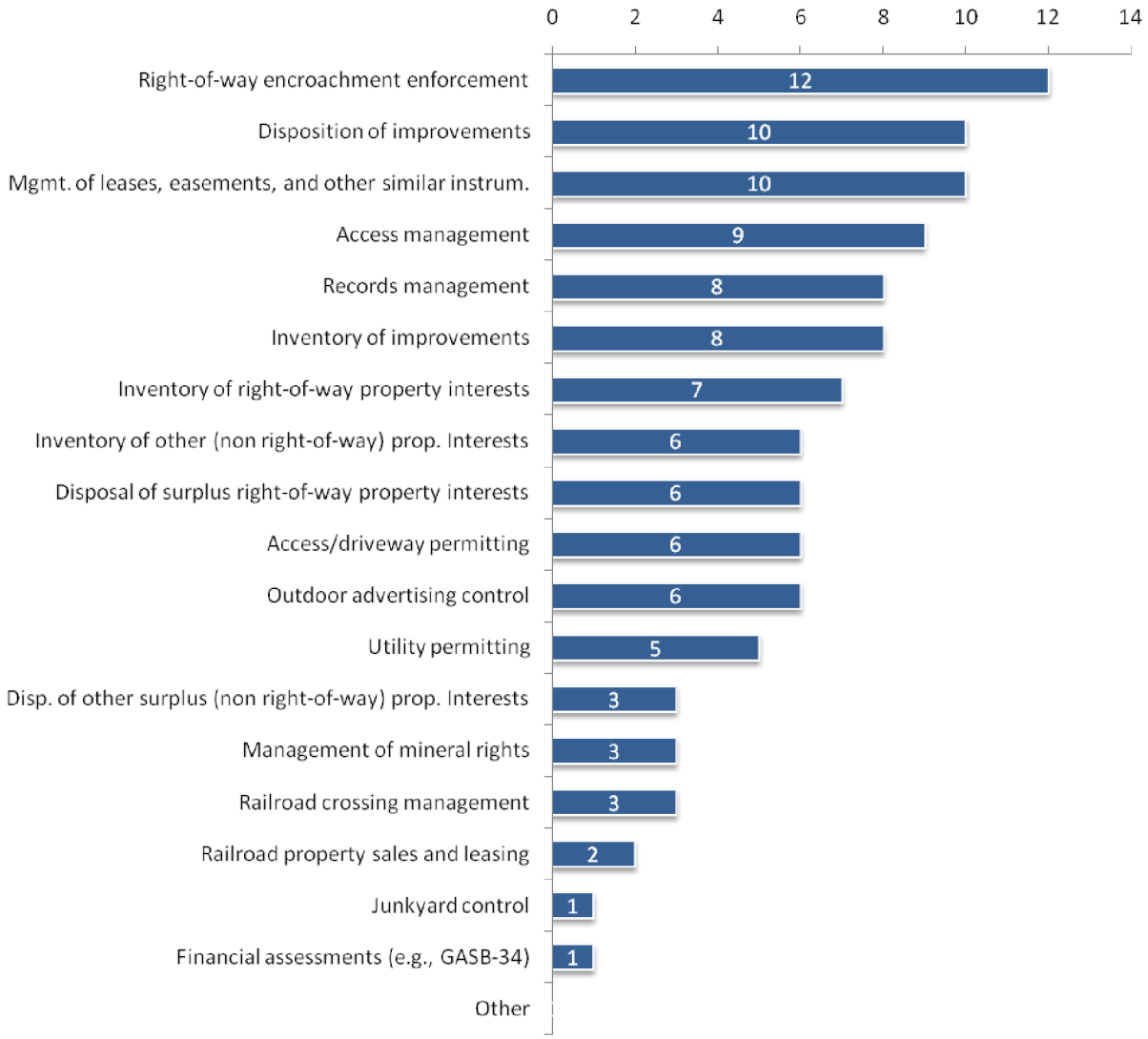


Figure B-20. Involvement of consultant participants in property management activities.

who work with state DOT clients in real property activities. A total of 20 participants provided feedback. A summary of the feedback follows:

- Internally, we train our appraisers to meet all appraisal and state DOT requirements.
- Our company offers in-house training programs, as well as IRWA classes and other third-party educational offerings.
- We have in-house training, IRWA courses, and state DOT-presented courses.
- Training provided by the state DOT.
- IRWA courses, state real estate commission courses.
- As a certified IRWA facilitator, one of the services our company provides is training for agency and consultant staff.
- Through IRWA, I facilitate over 25 different courses.
- None. The state fees are not sufficient to allow the company to cover training expenses.
- IRWA and NHI classes.
- IRWA and Appraisal Institute classes.

Property Management

Involvement of survey participants in property management activities was significant (Figure B-20). Participation in what is traditionally considered property management (i.e., records management, encroachment enforcement, disposition of improvements, and leases) was strong. By comparison, participation in activities that are outside the traditional realm of property management (e.g., financial assessments and management of mineral rights) was relatively minor.

Overall, responses are somewhat similar to those expressed by state DOT officials. However, there are some differences (e.g., consultants are less involved in the disposal of surplus property).

APPENDIX C

Integrated Transportation Project Development and Delivery Process Phases and Activities

Introduction

This appendix provides a detailed description of all the phases and activities of the transportation project development and delivery process. Figure 10 in the report provides a generalized view of the overall process (i.e., Level 1). Figure 11 shows a more detailed (intermediate) depiction of the process (i.e., Level 2). Figure 12 through Figure 18 provide zoomed-in views of the Level 2 model. These models correspond to the traditional design-bid-build project development and delivery method. Other methods could involve different activity sequences. For example, in design-build projects, it is common to hand off the project to a contractor at the beginning of the design phase, and that contractor is responsible for completing the design as well as the actual construction. In design-build projects, state DOTs typically retain overall responsibility for real property acquisition, although in some situations, states delegate these activities to the contractor (to the extent possible). Regardless of project delivery method, laws and regulations govern when certain critical activities can take place. For example, with certain exceptions, real property acquisition can only start after the environmental document has been prepared, reviewed, and approved.

Definition, Selection, Financing, and Scheduling

The purpose of this pool of activities is to identify and prioritize needs; develop the project scope; identify funding sources; secure federal, state, and local agreements; and authorize the project to proceed to the appropriate level of development. Scoping involves determining and documenting the project purpose and need; defining the project limits; identifying major challenges, issues, and risks; developing the approach and requirements for project development and delivery; and preparing preliminary cost estimates and schedules.

Develop Long-Range Transportation Plans

This activity involves conducting long-range transportation plans to facilitate the identification of needs, priorities, and financial resources. Long-range transportation plans include metropolitan transportation plans (MTPs), rural transportation plans, and statewide transportation plans (STPs), which provide a framework for long-term planning, development, and preservation of the transportation system in the state. Long-range transportation plans cover at least 20 years, are intermodal, and include a financial plan. Context sensitive solution (CSS) principles (as a collaborative, interdisciplinary approach to involve all stakeholders in the definition of a shared transportation vision) are sometimes used to help establish regional, local, and neighborhood vision or long-term objectives (*58**).

Identify Project Need and Purpose

This activity involves identifying the need for a project as well as the project goals and purpose so that the assessment of project requirements and preliminary cost estimates can start. The outcome is frequently in the form of a purpose and need statement. Factors for determining the need for a project may include crash frequency and severity, pavement or bridge conditions, and conformance with current geometric standards. For urban projects, particularly capacity improvements, project need may be determined from traffic modeling of future travel demands.

Identify Project Requirements and Conduct Studies

This activity involves defining basic project requirements and conducting supporting studies to develop a project scope that will guide subsequent phases of project development and delivery. One of the outcomes of this activity should be

*References appear on pages 124–127 in the report.

a high-level identification of environmental, real property, and utility requirements, which are frequently on the critical path in the development and delivery of transportation projects. In some cases, risk analysis tools assist with the identification of risks and critical project elements. Federal and state requirements and state policies frequently affect project requirements and development. Examples include environmental standard requirements, conformity to congestion management requirements, toll lane and high-occupancy vehicle (HOV) lane requirements, and railroad corridor preservation requirements. Studies conducted may include feasibility studies, PEL studies, traffic studies, and major investment studies (MISs).

Prepare Cost Estimate and Identify Funding Sources

This activity involves developing a preliminary cost estimate for the project and identifying potential funding sources. Identifying funding sources is one of the most critical activities in the project development process. Depending on the type and timing of the project, it may be necessary to consider alternative funding sources (e.g., public improvement districts, public-private agreements, transportation reinvestment zones, private funding, and donations). The project cost estimate needs to be updated throughout the project to reflect increasing levels in the amount of information and detail as well as decreasing levels in the amount of uncertainty and risk (*53, 59*).

Develop/Update Intermediate and Short-Range Programs

This activity involves developing or updating programs that lead to the identification of projects that should proceed to the next phase of development. Intermediate and short-range transportation programs typically include the unified transportation program (UTP) and the statewide transportation improvement program (STIP). The UTP is a 10-year program that covers all transportation modes and all types of projects. It identifies projects, indicates the authorized level of development, and lists estimated letting years for project-specific programs. The UTP is normally updated annually. The STIP is a 4-year program of work that is consistent with the statewide long-range transportation plan and the UTP. It includes a financial plan to document the availability of funds and required matching funds from state and local sources. A federal-aid project cannot be authorized for construction unless it is included in the STIP. STIPs are normally updated at least every 2 years but may be revised on a quarterly basis as warranted. Updating STIPs could include adjusting project priorities and refining project requirements and cost estimates.

Authorize Project Development

This activity usually involves programming the project (or certain phases of the project) and securing authorization to continue with subsequent phases. In some states, this milestone results in assigning a project number or ID that remains with the project for the rest of the process. It is also common at this point to designate a project manager who is responsible for scheduling and coordinating all the activities during the preliminary design phase.

Secure Federal, State, and Local Agreements

This activity involves preparing and executing agreements with other entities, particularly those that participate in funding for the development and delivery of the project. For federal-aid projects, it is necessary to execute a project agreement with FHWA before project expenses can be reimbursed. Authorizations and agreements are possible for projects that are included in an approved STIP and have met relevant environmental requirements (see the Environmental Process section). Those projects are funded based on state DOT requests for FHWA authorization to proceed with all or selected phases of project activity.

Most agreements are with governmental entities, mainly LPAs, although agreements with private-sector agencies for specific work (e.g., railroads and utility owners), are also possible. Agreements with LPAs can cover a wide range of activities, such as preliminary engineering, real property acquisition, utility coordination and relocation, design, construction, and maintenance. These agreements outline fund contributions and other responsibilities by each party. In a typical situation, the state DOT maintains responsibility for coordinating and completing certain tasks (e.g., real property acquisition or utility relocation) and the LPA contributes funds. However, it is also possible for the LPA to agree to coordinate and complete those activities with or without reimbursement from the state, depending on the situation. In the case of real property acquisition, although an LPA may be responsible for acquiring real property for a project, the project owner (i.e., the state DOT) is still responsible for ensuring that all appraisals, negotiations, and acquisitions comply with relevant federal and state laws and regulations.

This activity also involves preparing and executing agreements with other agencies to enable specific uses of the right-of-way without transferring title of the real property. An example of this type of use is when a city or a county agrees to share land for the transportation project but is not interested in, or is barred from, transferring title to the land. Another example is when the state DOT agrees to let other agencies use part of the right-of-way for purposes such as park-and-ride lots, hike-and-bike trails, or boat ramps.

Update Project Requirements, Cost Estimate, and Schedule

This activity involves updating project requirements, cost estimate, and schedule based on the information gathered during the preliminary engineering and environmental review phases. Updating the project scope is a critical activity that helps to guide project development and delivery while minimizing the risk of scope creep and project overruns.

Authorize Project Design

This activity involves authorizing a project to proceed with the development of detailed design plans, construction specifications, detailed cost estimate, and real property acquisition. Authorizing project design enables agencies to substantially complete design and real property activities, after which the project becomes a candidate for construction authorization.

Authorize Project Construction

This activity involves authorizing a project to proceed with the construction phase. Authorizing project construction enables agencies to complete all phases of work for a project, and generally applies to projects that are relatively advanced in the design phase.

Alternative Analysis and Preliminary Plans

The purpose of this pool of activities is to conduct studies of alternative locations and alignments, coordinate public and agency interaction as part of the environmental process (see next section), and develop the selected alternative in preparation for the design phase.

Conduct Conceptual Design Meeting

This activity involves conducting a meeting to identify fundamental concepts and preliminary design criteria for a project. It includes using or updating project summary checklists and forms to help document project requirements. (Note: This activity is not the same as the conceptual design meeting that some state DOTs conduct at the beginning of the design phase.)

Collect Data for Preliminary Design

This activity involves identifying and collecting data needed for the preliminary design. Examples of data include traffic and traffic crash data; site visit data; information about existing utility facilities; information about previous hydraulic studies; aerial imagery, DTMs, and topographic and other relevant surveys. Data gathered also include information about previous studies and reports.

Obtain Permission to Enter Property

This activity involves obtaining permission to enter a property where data collection needs to take place. Depending on the situation, it can range from requesting verbal or written permission from the property owner to following more complex procedures as required by laws and regulations. Practices throughout the country vary widely. In general, temporary entry for survey and data collection purposes is not considered a taking (*60*). However, damages to property during the data collection activity are normally subject to compensation (*60, 61*). In some states, the power of eminent domain carries the right to enter a property that the state is planning to acquire. However, regardless of legal considerations, obtaining the consent of the owner prior to entering his/her property is an example of a best practice for building rapport and good will that contributes to a more effective working relationship and a smoother property acquisition process.

Obtaining permission to enter property is a critical activity in connection with the collection of data during the preliminary engineering phase. It is recommended to process right-of-entry requests for engineering surveys separately from environmental surveys. It is also recommended to process right-of-entry requests to access railroad property separately.

Develop Alternative Alignments (Preliminary Schematics)

This activity involves developing alternative alignments (or preliminary schematics) and typical sections. Each alternative includes completing a traffic operational analysis to determine anticipated levels of service (LOS), developing preliminary construction and real property cost estimates, and evaluating how the alternative meets the project purpose and need. This activity involves preliminary coordination with other stakeholders. Coordination with resource agencies is particularly critical for the review of alternative alignments to avoid surprises during the environmental process (see next section).

Select Preferred Alignment and Develop Geometric Schematic

This activity involves developing a preferred alignment and a geometric alignment in preparation for (or as part of) consultations with the public and the environmental process (see next section). Schematic development includes activities such as refining alignments and geometrics, preparing preliminary plans and layouts, developing preliminary pavement

design reports, conducting hydraulic studies, and conducting preliminary planning for bridges. It also involves circulating the geometric schematic for review by stakeholders such as MPOs; regional transportation agencies; other agencies at the local, state, and regional levels; and the public. It also includes reviewing the schematic based on feedback from stakeholders.

Conduct VE Study

This activity involves reviewing and analyzing the project systematically to develop suggestions for improving the value and quality of the project, meeting the project objectives at the lowest overall cost, and reducing the time to complete the project. The VE study is normally the responsibility of a multidisciplinary team of experts who are not involved in the project. VE studies are recommended whenever there is a high potential for cost savings relative to the cost of the VE analysis or the potential exists to improve project performance or quality (e.g., when the project involves complex technical issues, challenging constraints, unique requirements, and competing community and stakeholder objectives).

MAP-21 introduced several changes to the criteria and thresholds for conducting VE studies. Beginning on October 1, 2012, a VE analysis is required for projects on the National Highway System (NHS) receiving federal assistance with an estimated total cost of $50,000,000 or more. A VE analysis is also required for bridge projects on the NHS receiving federal assistance with an estimated total cost of $40,000,000 or more. Prior to MAP-21, a VE analysis was required for federal-aid projects with an estimated total cost of $25 million or more or for bridge projects with an estimated total cost of $20 million or more. Under MAP-21, a VE analysis is not required for non-NHS projects or for design-build projects.

Obtain Approval for Final Geometric Schematic

This activity involves securing approval of the revised geometric schematic. Pending approval of the environmental document, approval of the preliminary plans is one of the prerequisites for a project to proceed to the detailed design phase.

Environmental Process

The purpose of this pool of activities is to consult with environmental resource agencies and the public to ensure the project meets all relevant environmental laws, regulations, and policies. Several federal laws and regulations govern the environmental process, including the following (*62*):

- The National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321 et seq.), requires the use of an interdisciplinary approach in planning and decision making for actions that affect the environment. NEPA requires an assessment of environmental impacts on the human environment and consideration of alternatives and mitigation where feasible.
- 23 CFR 771 and 40 CFR 1500-1508 contain federal environmental regulations that are the basis for surface transportation projects. In general, 23 CFR 771 requires documentation to demonstrate compliance, an evaluation of alternatives including a no-build alternative, public involvement, and mitigation when necessary. 40 CFR 1500-1508 include procedures for the implementation of NEPA requirements, including how to reduce the length of required assessments and how to reduce project development delays caused by NEPA-required activities. Examples of delay reduction strategies mentioned in the regulation include:
  - Integrate the NEPA process into early planning.
  - Emphasize interagency cooperation before preparing environmental documents, rather than submitting adversary comments on completed documents.
  - Use the scoping process for an early identification of real issues.
  - Establish appropriate time limits for the environmental document preparation process.
  - Prepare environmental documents early in the process.
  - Eliminate redundancy with state and local procedures by providing for joint preparation of environmental documents.
  - Combine environmental documents with other documents.
- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended (codified as 42 U.S.C. 9601 and following), addressed uncontrolled releases of hazardous substances and, in particular, assigned liability to responsible parties to clean up uncontrolled hazardous waste sites. The 1980 act is also known as the Superfund Act. The Superfund Amendments and Reauthorization Act (SARA) of 1986 revised CERCLA and extended the taxing authority for the Superfund Trust Fund. It also led to passage of the Emergency Planning and Community Right-to-Know Act (EPCRA), also known as SARA Title III (codified as 42 U.S.C. 11001 and following).

The characterization of hazardous materials is an integral component of the environmental process, with ramifications for the valuation of real property that may be acquired for a transportation project. If the contamination from hazardous substances occurs in the right-of-way, the project owner can be responsible regardless of whether the agency caused or knew of the contamination. For example, the agency can be responsible if it is a current owner or operator of the facility, a former owner or operator at the time of disposal of the

hazardous substance, the party who arranged for disposal, or the party who transported the substance. Minimizing liability involves assessing and managing potential environmental risks as they are discovered, exercising due diligence, and in some cases, using indemnification.

Provide Planning and Environmental Linkages

This activity involves including environmental considerations in the planning process and facilitating the transition of activities or decisions from the planning process to the environmental review process. PEL is often described as linking planning and NEPA and is considered a best practice for streamlining the overall project development and delivery process.

PEL enables the analysis of alternatives during the planning phase and a simplification of the environmental review, such as if alternatives are eliminated based on analysis performed during the planning process and then not re-studied during the environmental decision-making process (*63, 64, 65*). PEL helps to reduce duplication of work and foster better decision making by promoting early coordination of planning and environmental staff. It also facilitates the use of information produced in the planning process to address and resolve NEPA-level issues, including, but not limited to, the purpose and need statement, documentation of the range of alternatives, identification of significant environmental and community impacts, and identification of potential indirect and cumulative impacts. Specific to real property acquisition, PEL enables the early engagement of right-of-way staff to assess potential real property impacts under various project alternatives being assessed in the planning phase, document initial real property scoping and cost estimate requirements, and make this information available for use during the environmental process.

Prepare Draft Environmental Documentation

This activity involves conducting a series of activities that lead to the preparation of an appropriate environmental document, which, depending on the situation, could be one of the following:

- **Categorical exclusion.** A CE applies to projects that, based on previous experience, do not involve significant environmental impacts.
- **Environmental assessment.** An EA applies to projects that do not meet the requirements for a CE or do not clearly require the preparation of an environmental impact statement, or to projects for which it is believed that an EA would assist in determining the need for an EIS (e.g., when the significance of the potential impacts is unknown).
- **Environmental impact statement.** An EIS applies to projects that may have significant social, economic, and/or environmental impacts.

Preparing the environmental document often requires identifying public and environmental concerns, conducting early and frequent interagency coordination, and gathering data from ground surveys, as well as federal, state, and local agency databases. It also requires completing a number of impact assessment evaluations, including natural and cultural resource impacts, hazardous materials, socioeconomic impacts, air quality studies, and noise impacts.

Of particular interest to real property workflows is the identification of public and environmental concerns at the beginning of the environmental process, interagency coordination, evaluation of hazardous materials, and evaluation of socioeconomic impacts. Identifying public and environmental concerns involves identifying environmental variables and plans for public involvement. This task, which also includes an initial assessment of the project site, should be performed concurrently with the development of alternative alignments and the determination of major utility facility and property ownership concerns within the proposed right-of-way.

Interagency coordination involves contacting resource agencies and other stakeholders to gather feedback and other related information in connection with the project. Resource agencies have regulatory and permitting authority for proposed construction activities within their jurisdiction, which makes it critical to include project scope of work items that cover applying for all the necessary permits and complying with all relevant federal and state laws and regulations. Particularly for large projects, it is strongly recommended to involve resource agencies to review alternative alignments and get a preliminary buy-in for a preferred alternative (see previous section) before completing the preparation of the environmental documentation.

The characterization of hazardous materials is an integral component of the environmental process, with ramifications for the valuation of real property that may be acquired for a transportation project. If the contamination from hazardous substances occurs in the right-of-way, the project owner can be responsible regardless of whether the agency caused or knew of the contamination. For example, the agency can be responsible if it is a current owner or operator of the facility, a former owner or operator at the time of disposal of the hazardous substance, the party who arranged for disposal, or the party who transported the substance. Minimizing liability involves assessing and managing potential environmental risks as they are discovered, exercising due diligence, and in some cases, using indemnification.

The evaluation of socioeconomic impacts involves assessing potential impacts on the community and residents. This includes regional and community growth patterns, impacts to individuals within the community (including persons who might be displaced by the transportation project), publicly owned lands, and cultural resources such as historical and archaeological resources. Projects must comply with EJ requirements to identify and address disproportionately high, adverse human health or environmental effects on minority and low-income populations, as well as requirements for services to those with LEP.

Conduct Public Meetings

This activity involves conducting and documenting one or more meetings to provide public access to the decision-making process and provide an avenue for public input. For projects that involve added capacity or public lands (i.e., Section 4[f] or 6[f] properties), a public hearing is generally required. Public meetings before a formal public hearing are common if a large amount of real property is needed for the project, the roadway function changes substantially, or controversy about the project is substantial, or for any high-profile project. In practice, most projects at transportation agencies are CE projects. For these projects, a written notification usually satisfies the requirement for a meeting with affected property owners. As a result, a public hearing is not required. Public hearings are typically advertised in newspapers and other media in accordance with FHWA and state regulations. Regulations govern a variety of other requirements regarding public meetings, including geographic location, room size, agenda, protocol, and procedures.

Develop Final Environmental Document

This activity involves developing the final environmental document based on the feedback received from resource agencies and the public.

Obtain Environmental Clearance

This activity involves obtaining approval of the environmental document, which is a critical requirement to proceed with the design phase. Review and approval of the environmental document is the responsibility of a designated state agency (for non-federal-aid projects) or FHWA (for federal-aid projects) depending on the document classification.

Required documents for the environmental clearance may include the following, depending on the type of environmental document required:

- Public involvement notes and comments.
- Purpose and need statement.
- Relevant environmental analyses and studies.
- Landscape recommendations.
- Environmental mitigation plans.
- Public comments and responses.

Meet Environmental Commitments After Clearance

Meeting environmental commitments after clearance involves conducting activities needed to comply with environmental commitments (e.g., in connection with contamination handling and remediation activities in accordance with existing laws and regulations). It also involves coordination during real property acquisition and relocation of displaced persons. This activity usually starts during design and can continue through construction, or even after construction, to ensure the activities completed to meet environmental commitments actually work as designed or scheduled.

Conduct Environmental Reevaluation

This activity involves conducting a reevaluation of environmental issues after the approval of the environmental document. Situations that could warrant an environmental reevaluation include changes in design, scope, land use, or real property requirements; new environmental impacts or changes to environmental impacts since the approval of the environmental document; regulatory changes; or the elapse of a prescribed number of years of no activity (e.g., no design work or no real property acquisition) (*66*). A reevaluation document can be as simple as a checklist or a note to the file, or can be a comprehensive document. There is usually not a standard format. For most projects (which are CE projects), reevaluations should succinctly verify that the scope of the project remains essentially the same; address any changes to the project and resulting impacts to natural, cultural, or social resources; and conclude that the environmental document or CE determination remains valid.

Design and PS&E Assembly

The purpose of this pool of activities is to complete and submit the project design in preparation for letting. It includes detailed and supplemental data collection; detailed engineering and design analyses to finalize the project's horizontal and vertical alignment; detailed design of elements such as roadway, operations, bridges, drainage, retaining walls, and other structures; sequence of work and traffic control plans; development of specifications and cost estimates; and PS&E assembly. Major milestones typically include a design meeting at the beginning of the design phase; 30 percent, 60 percent, and 90 percent design completion (referred to sometimes

as Stage 1, 2, 3 Design); 100 percent design completion; and completion and submission of the PS&E package.

Conduct Design Meeting

This activity involves scheduling and conducting a design meeting at the beginning of the design phase. The design meeting typically occurs after the environmental approval and the authorization to acquire property, and involves the project manager, the schematic team, the design team, and other stakeholders. The purpose of the design meeting is to review the basic design parameters, concepts, and criteria that were established during the preliminary design phase or by the project manager and confirm or update design criteria necessary to start the detailed design work.

There is a wide range of practices regarding when to schedule (and what to include in) the design meeting. Depending on factors such as project characteristics and urgency, some agencies hand off projects to the design team when the project is already 15–30 percent design complete. Prior to the design meeting, it may also be necessary to update some background information, particularly if the project has been inactive for some time.

Conduct Design Analyses

This activity involves completing a series of detailed analyses in preparation for the development of the final horizontal and vertical alignments. Examples of detailed analyses, which may be performed concurrently, include:

- Collect supplemental, detailed design data. This task involves planning for and collecting new or additional data needed for the design. Examples of relevant data collection efforts include geotechnical surveys, topographic surveys, and traffic data.
- Develop environmental mitigation details. This task involves designing environmental mitigation details that were identified during the environmental process (e.g., creation or restoration of wetlands, cleanup of hazardous materials or petroleum products, relocation or protection of threatened species, removal or treatment of groundwater, and protection of historic properties).
- Conduct construction sequence and detour/road closure analysis. This task involves developing a construction sequence plan that optimizes construction activities as well as mobility and safety. It also involves developing a preliminary detour or road closure plan.
- Conduct hydrologic and hydraulic analyses. This task involves refining and/or extending the hydrologic study (normally produced during the preliminary design phase) and completing a detailed hydraulic analysis to identify the design storm frequency, crossing structure size and type, and bridge scour design parameters. This analysis is frequently on the critical path, which makes it important to coordinate this activity with the development of the final alignment design.

Develop Final Horizontal and Vertical Alignments

This activity involves developing the final horizontal and vertical alignments based on which the detail design of a wide range of structures will proceed. This activity normally takes place between 30 percent and 60 percent design and includes a thorough review of previous data collection activities and analyses. It involves producing detailed plans, profiles, cross sections, and, increasingly, 3D models.

Conduct Detailed Design

This activity involves completing a series of detailed design tasks in preparation for the PS&E assembly. Some of these detailed design tasks have a real property component. Some tasks, such as the following, may be performed concurrently:

- **Complete roadway design.** Activities include computing earthwork volumes; completing landscape and aesthetics plans; designing bicyclist and pedestrian facilities; designing miscellaneous details such as ramp grading, non-standard inlets, curb and gutter transitions, driveway details, and grate and manhole covers; and checking for design exceptions or waivers.
- **Execute railroad agreements.** It is normally required to execute agreements with railroad companies before doing any work on railroad right-of-way (e.g., in the case of grade separations, roadway improvements at grade crossings, seal coats, overlays, and buried and overhead communication infrastructure). Dealing with railroad companies is in some ways similar to dealing with utility owners. In both cases, the process involves identifying and evaluating impacts, analyzing resolution strategies, coordinating with external entities, negotiating and executing agreements, and planning and conducting field construction. There are also significant differences, which can make coordination with railroads at many levels (including the real property function) particularly challenging. Through the Second Strategic Highway Research Program (SHRP 2), TRB is engaged in active research to identify and promote strategies for improvement in the relationship between transportation agencies and railroad companies (*67*).
- **Complete operational design.** Activities include completing the signalization plan and other relevant intelligent

transportation system (ITS) design elements, the illumination system, and relevant signing and striping design elements.
- **Complete bridge design.** This activity involves collecting any additional geotechnical data that may be necessary and completing bridge design (superstructure and substructure of span bridges, as well as culvert details to handle design loads) and structural details.
- **Complete drainage design.** This activity includes hydraulic design for culverts and storm drains, hydraulic design for pump stations, drainage details, and storm water pollution prevention plans. Drainage design requires close coordination with roadway design.
- **Complete design of retaining and noise walls.** This activity includes the design of structures such as retaining and noise walls. These structures frequently have secondary real property and utility relocation implications. The reason is the typical location of retaining and noise walls (close to the right-of-way line) and the timing for identifying the need for those structures (sometimes late in the design phase, i.e., after real property needs have been identified and acquired and some utility relocations have already taken place).
- **Complete design of miscellaneous structures.** This activity includes the design of other structures such as concrete traffic barriers, overhead sign bridges, high mast illumination, and customized bridge rail designs.
- **Complete sequence of work and traffic control plan.** This activity includes developing and/or refining the construction sequence of work plan and the traffic control plan.
- **Prepare construction specifications and provisions.** This activity includes developing standard and special construction specifications as well as special provisions, which will guide the construction phase of the project.
- **Prepare cost estimate.** This activity includes developing the engineer's estimate of the anticipated cost to build the project.
- **Execute agreements and obtain permits.** This activity includes executing third-party agreements and obtaining all the necessary permits with regulatory agencies that have permitting requirements for proposed construction activities. Examples of situations requiring permits include floodplain changes, affecting or building bridges over navigable waters, building an international bridge, affecting wetlands, storm water discharges, and affecting endangered species.

Conduct 30 Percent, 60 Percent, and 90 Percent Design Meetings

This activity involves scheduling and conducting meetings at critical milestones (typically at 30 percent, 60 percent, and 90 percent design). These meetings are intended to track the progress of ongoing design activities, further develop design concepts from previous meetings, identify design conflicts, and investigate solution alternatives.

What to include and what documents to prepare for each of the meetings depends on factors such as project type, urgency, local practices, as well as agency policies and requirements. For example, for a 30 percent design meeting, it is common to review design analysis results and progress made to finalize the horizontal and vertical alignments. Real property acquisition and utility coordination activities are also discussed (although it is common for utility owners to start participating actively once the horizontal and vertical alignments are substantially complete). A 60 percent design meeting normally includes a review of detailed plans, profiles, and cross sections; specific requirements for detailed design features; and progress of real property acquisition and utility coordination and relocation. A 90 percent design meeting normally includes a review of all design documents and a discussion of forms and other requirements to prepare the PS&E package.

Prepare PS&E Package

This activity involves assembling the PS&E package and supporting documents. It also includes conducting quality control checks on the PS&E package to ensure accuracy and completeness.

Conduct Final Design and Initial Construction Coordination Meetings

This activity involves scheduling and conducting meetings to finalize the design phase and begin the transition to the construction phase. Finalizing the design phase includes reviewing and approving the PS&E package to facilitate the letting process as well as coordinating with affected stakeholders (e.g., design project manager, designers, utility owners, and construction project manager) all activities necessary for a successful hand off from design to construction.

Right-of-Way Map, Authorization to Acquire Property, Property Acquisition, and Relocation Assistance

The purpose of this pool of activities is to identify properties that need to be acquired, obtaining authorization to acquire those properties, acquiring the properties, and providing assistance for the relocation of displaced persons and businesses. Several federal laws and regulations govern the acquisition of property for transportation projects, including the following:

- The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 was enacted as Public Law

91-646 in January 1971. The Uniform Act, which is codified as 42 U.S.C. 4601 et seq., provides the basic federal law for uniform real property acquisition and relocation assistance. 42 U.S.C. 4601 et seq. includes three subchapters, as follows:
  - Subchapter I—General Provisions.
  - Subchapter II—Uniform Relocation Assistance.
  - Subchapter III—Uniform Real Property Acquisition Policy.

  Several other federal laws bear on the acquisition of real property for public use (e.g., in relation to civil rights, environmental concerns, age discrimination, and flood disaster protection), as described in the FHWA *Project Development Guide* (*1*).
- 49 CFR 24 is the main source of federal regulation for implementation of the Uniform Act. The regulation applies to all federal agencies as well as federally assisted programs administered by those agencies. 49 CFR 24 includes the following subparts:
  - Subpart A—General.
  - Subpart B—Real Property Acquisition.
  - Subpart C—General Relocation Requirements.
  - Subpart D—Payments for Moving and Related Expenses.
  - Subpart E—Replacement Housing Payments.
  - Subpart F—Mobile Homes.
  - Subpart G—Certification.
- 23 CFR 710 applies to programs that FHWA administers whenever federal assistance under 23 U.S.C. is used. It addresses specific transportation and funding reimbursement topics not covered in the Uniform Act or 49 CFR 24. 23 CFR 710 includes the following subparts:
  - Subpart A—General.
  - Subpart B—Program Administration.
  - Subpart C—Project Development.
  - Subpart D—Real Property Management.
  - Subpart E—Property Acquisition Alternatives.
  - Subpart F—Federal Assistance Programs.
  - Subpart G—Concession Agreements.

Provide Planning and Real Property Acquisition Linkages

This activity involves conducting a high-level assessment of potential corridor real property requirements during the planning and programming phase and facilitating the transition of activities and decisions that pertain to real property impacts to the environmental review and the process to acquire real property for the project. This activity is usually not mandatory but is highly recommended to help identify major real property acquisition issues early in the process.

Conduct Real Property Research

This activity involves identifying real property interests and restrictions such as existing right-of-way limits, easements, and property owners from records maintained by local public entities. This activity takes place at the beginning of the preliminary design phase, along with other data collection activities in preparation for the development of alternative alignments. Later in the preliminary design phase, it also involves conducting data-gathering activities needed to refine preferred alignments to minimize real property impacts.

Coordinate with Other Stakeholders

This activity involves coordinating activities with other stakeholders in the project development process (e.g., in relation to preliminary engineering requirements, potential relocation issues, and hazmat concerns). Coordination usually takes place through project development teams that include the project manager, staff from various relevant sections, and representatives of local and regional transportation agencies. This activity takes place in conjunction with the development of preliminary alignments and the preparation of the draft environmental documentation.

Prepare Right-of-Way Map and Property Descriptions

This activity involves developing maps, property descriptions, and other required documentation for each parcel or property interest that needs to be acquired. (Note: The term "parcel" may have different meanings in different states. For example, in one state a parcel might refer to the complete bundle of rights associated with a property, but in another state it might refer to each interest associated with a property.) Usually, right-of-way maps and property descriptions must be prepared by registered professional land surveyors in accordance with existing surveying laws, standards, and specifications. Although it is common to prepare sketches and other preliminary drawings while developing alternative alignments in support of the environmental process, the official right-of-way map is prepared after the final geometric schematic has been developed.

Obtain Authorization to Acquire Real Property

This activity involves requesting and obtaining authorization to acquire real property for a project. State DOTs use a variety of names for this authorization, including right-of-way release and right-of-way clearance. Typical requirements for obtaining authorization to acquire real property include

obtaining approval of the environmental document and an approved right-of-way map and executing agreements with LPAs to contribute funds (as needed). Shortly after obtaining authorization to acquire property, it is necessary to identify all impediments or special challenges in connection with the acquisition of real property (e.g., parcels without clear record title, parcels with hazardous materials, and special relocation needs). To reduce the impact of these challenges, it is advisable to prepare a prioritized schedule for acquiring parcels and a list of issues pertinent to each parcel.

Under certain conditions, it is possible to acquire property prior to the normal authorization to acquire real property, more specifically prior to the completion of the environmental document. The conditions under which advance acquisitions can take place vary, depending on whether the advance acquisition involves state-only funding or federal-aid funding. According to 23 U.S.C. 108, state-funded advance property acquisitions (23 U.S.C. 108[c]) can take place before completion of the environmental review without affecting subsequent approvals required by the state or a federal agency. Federally funded advance acquisitions (23 U.S.C. 108[d]) are subject to the provisions of the Uniform Act and 49 CFR 24 and require the completion of the environmental review before authorizing federal funds for the acquisition of the real property.

Following 23 CFR 710.501-505, early acquisitions include hardship acquisitions, protective buying, and donations. Hardship acquisition is an early acquisition at the property owner's request to alleviate hardship to the owner. Protective buying is an early acquisition to prevent imminent development and increased costs on the preferred location, which would limit transportation choices.

Conduct Appraisal or Waiver Valuation

This activity involves conducting a written appraisal of the fair market value of the property or preparing a waiver valuation in situations that involve the acquisition by sale or donation of real property with a low fair market value.

According to the Uniform Act, real property must be appraised before the initiation of negotiations, except in situations that involve an acquisition by sale or donation with a low fair market value. The act does not describe the procedure for preparing waiver valuations. The owner or a designated representative must be given an opportunity to accompany the appraiser during the inspection of the property. Appraisals must disregard decreases or increases in the fair market value of the property caused by the project or by the likelihood that the property might be acquired for the project. Appraisals should also include uneconomic remnants and an equal interest in all buildings, structures, or other improvements that need to be removed or that are adversely affected. For buildings, structures, or other improvements, the appraisal should also include the contribution to the fair market value of the property to be acquired or the fair market value for removal from the real property, whichever is greater (notwithstanding the right or obligation of a tenant to remove the buildings, structures, or other improvements at the expiration of the lease).

According to 49 CFR 24, the appraisal must be prepared by a qualified appraiser, using an agreed-upon scope of work as a basis to outline the expectations of the agency and the responsibilities of the appraiser. Agencies must establish criteria for determining the minimum qualifications and competency of appraisers and review appraisers. Contract (fee) appraisers must be state licensed or certified. In addition, an agency must offer to acquire at least an equal interest in all tenant-owned buildings, structures, or other improvements that need to be removed or that are adversely affected. This must include any improvement of a tenant-owner, who has the right or obligation to remove the improvement at the end of the lease term. Moreover, 49 CFR 24 defines just compensation for a tenant-owned improvement as the amount that the improvement contributes to the fair market value of the property, or its salvage value, whichever is greater. The Uniform Act does not include a reference to the salvage value of a tenant-owned improvement.

According to 49 CFR 24, an appraisal is not required if the owner is donating the property and releases the agency from its obligation to appraise the property, or the agency determines that an appraisal is unnecessary because the valuation is uncomplicated and the fair market value of the property is $10,000 or less. This threshold could be increased up to $25,000 if the agency offers the property owner the option to have the agency appraise the property, and the owner decides the appraisal is not necessary. If the property owner selects the appraisal option, the agency must conduct the appraisal and the threshold increase does not apply. The regulations also state that the person who prepares a waiver valuation must have a sufficient understanding of the local real estate market.

According to 49 CFR 24, appraisals are intended to be consistent with USPAP. In some situations, there may be a conflict with the standard if the scope of work is not defined properly, which has implications for licensing and liability. For example, an agency may define a scope of work without working collaboratively with the appraiser. However, according to USPAP, one of the responsibilities of the appraiser is to define the scope of work. Several factors influence what goes into a scope of work, including state practices and requirements, project characteristics, parcel conditions, and equipment value.

According to 49 CFR 24, after the initial appraisal has been conducted, a review appraiser conducts a review of

the appraisal for consistency with both industry and agency standards and practices. As needed, the review appraiser requests corrections or revisions to the appraisal. The review appraiser identifies each appraisal report as recommended (as the basis for the establishment of the amount believed to be just compensation), accepted (meets all requirements, but not selected as recommended or approved), or not accepted. If the review appraiser is not able to recommend an appraisal and the agency determines that it is impractical to obtain an additional appraisal, the review appraiser may present and analyze market information to support a recommended value. Additionally, the review appraiser must prepare a written report that identifies the appraisal reports reviewed and documents all the findings.

Establish Just Compensation

This activity involves determining the amount of just compensation for the property being acquired, i.e., the amount that results in both the property owner and the public being treated fairly (*61*).

According to the Uniform Act, the acquiring agency must establish an amount that is believed to be just compensation for the real property. This amount cannot be less than the approved appraisal of the market value of the property. A requirement for establishing just compensation is to disregard any decrease or increase in the fair market value of real property prior to the date of valuation caused by the project, or by the likelihood that the property would be acquired for the project, other than that caused by physical deterioration within the reasonable control of the owner.

According to 49 CFR 24, the amount determined to be just compensation must be approved by a responsible official of the acquiring agency. The initial offer may not be less than the amount of the agency's approved appraisal but may exceed that amount if the agency determines that a greater amount reflects just compensation for the property. The agency must take into account the value of allowable damages or benefits to any remaining property.

Typically, an appraiser develops an estimate of the fair market value, and just compensation is the amount the state DOT offers or pays. However, just compensation and fair market value are not defined or used consistently in all 50 states. For example, in Texas, the fair market value is estimated by the appraiser, and the sum of this value and any associated damages becomes the amount of just compensation. Michigan has a provision to increase the estimate of the fair market value if a residential property is owner-occupied. Florida has a provision to increase the estimate of the fair market value if the right-of-way administrator provides an explanation of why the appraised value was not sufficient.

Prepare and Make Written Offer

This activity involves making a written offer to the owner to acquire the real property for the full amount believed to be just compensation.

According to the Uniform Act, prior to the initiation of negotiations, the acquiring agency must provide the owner with a written statement of the amount that was established as just compensation, and a summary of the basis for establishing this amount. Partial acquisitions must list separately any compensation for damages to the remaining real property. In addition, if the partial acquisition would leave the owner with an economic remnant, the written offer must include an offer to acquire the uneconomic remnant. The acquiring agency must also make an offer to tenants for tenant-owned improvements provided that the offer does not result in duplication of payments. The payments can be made if the landowner disclaims all interest in the tenant's improvements. Although tenants have a right to reject payment and seek payment under other applicable laws, they must also assign, transfer, and release right, title, and interest on those improvements.

According to 49 CFR 24, the offer must be written in plain, understandable English. If the recipients of the offer are unable to read and understand the offer, translation and counseling services must be provided to them. The summary statement must include the statement of the amount offered as just compensation; a description and location identification of the real property and the interest in the real property to be acquired; and the identification of the buildings, structures, and other improvements (including removable building equipment and trade fixtures) that are included as part of the offer of just compensation. The statement must also identify held-ownership interests in the property, if any, and indicate that they are not covered by the offer.

Acquire by Negotiation

This activity involves conducting negotiations that result in both parties agreeing on a purchase price, paying the agreed-upon price, and reimbursing the property owner for reasonable title transfer expenses.

According to the Uniform Act, the acquiring agency must make every reasonable effort to acquire real property expeditiously by negotiation. Negotiations must be conducted free of any attempt to coerce the property owner into reaching an agreement. In case of donations, owners must also be informed about their right to receive just compensation prior to donating their property. The act does not address other options such as administrative settlements or alternate dispute resolutions.

According to the act, prior to requiring the owner to surrender possession, the acquiring agency must pay the owner

the agreed purchase price. The owner must also be reimbursed for reasonable title transfer expenses, including recording fees, transfer taxes, and other similar expenses; penalty costs for prepaying a preexisting mortgage; and prorated property taxes. In the case of an occupied property, the agency can require an owner to surrender possession only if 90 days have passed since providing a 90-day written notice (of the date by which move is required) to the owner.

According to 49 CFR 24, the agency must make every effort to contact the property owner or a representative and discuss the offer, while providing the owner with a minimum of 30 days to review it. The agency also has to document that the offer has been received either in person or by certified mail. As opposed to the Uniform Act, 49 CFR 24 addresses the need or procedure for updating appraisals or reestablishing just compensation.

49 CFR 24 addresses requirements for an agency to acquire real property through administrative settlements and donations, but not through alternate dispute resolutions. According to 49 CFR 24, the purchase price for the property may exceed the amount offered as just compensation when reasonable efforts to negotiate an agreement at the specified amount have failed and an authorized agency official determines the administrative settlement to be reasonable, prudent, and in the public interest. The agency must also prepare a written justification for the administrative settlement when federal funds pay for or participate in acquisition costs. 49 CFR 24 clarifies that an agency must pay title transfer costs to the billing agent of the property owner whenever feasible. According to 23 CFR 710, an administrative settlement can be reached prior to filing a condemnation proceeding based on value-related evidence, administrative consideration, or other factors approved by an authorized agency official.

According to 49 CFR 24, an agency can obtain right-of-entry for construction purposes prior to paying the owner the agreed purchase price only in the exceptional case (e.g., an emergency project) where there is no time to make an appraisal and a purchase offer and the owner approves this process.

According to 49 CFR 24, negotiations also involve determining who can be authorized to negotiate on behalf of the agency. Specifically, negotiators may not supervise or formally evaluate the performance of any appraiser or review appraiser performing appraisal or appraisal review work (although this requirement could be waived if it causes a hardship for the agency). Although it is not mandatory, an appraiser may be authorized to act as a negotiator for real property for which that person has made an appraisal if the offer to acquire the property is $10,000 or less. A similar consideration applies in the case of review appraisers and waiver valuation preparers.

Acquire by Condemnation

This activity involves conducting condemnation proceedings to acquire the property when the parties cannot reach a mutual agreement about the terms and conditions of the purchase (and it has been determined that the agency has the power of eminent domain).

According to the Uniform Act, condemnation proceedings (the trigger of which is not mentioned in the act) must be conducted so that the owner does not need to initiate legal proceedings to prove the fact of the taking of the property. If the final judgment is that the agency can acquire the real property by condemnation, the agency must deposit in court an amount (in accordance with 40 U.S.C. 3114[a] to [d]) not less than the agency's approved appraisal of the fair market value of the property or the court award of compensation. The owner must also be reimbursed for reasonable title transfer expenses including recording fees, transfer taxes, and other similar expenses; penalty costs for prepaying a preexisting mortgage; and prorated real property taxes. The owner must be reimbursed for reasonable attorney, appraisal, and engineering fees if (a) the court decides that the agency cannot acquire the property by condemnation or the agency abandons the proceedings, or (b) the owner starts legal proceedings and the court awards compensation for the taking of the owner's property.

In the case of an occupied property, the agency can require an owner to surrender possession only if 90 days have passed since providing a 90-day written notice (of the date by which move is required) to the owner.

49 CFR 24 contains essentially the same provisions as the Uniform Act, except that 49 CFR 24 includes a requirement to pay title transfer expenses directly to the billing agent of the property owner whenever feasible.

Condemnation proceedings typically have a major impact on real property acquisition schedules and cost. It is not unusual for condemnation proceedings to take several years and result in significant litigation costs that are significantly higher than the original appraisal value or written offer. Because of the impact on time and costs, it is common to use the possibility or risk of condemnation proceedings as a justification for administrative settlements.

The typical acquisition process by condemnation includes steps such as filing in court to condemn the property, attending hearings, depositing funds in court based on the court's decision, and getting title to the property. In practice, there are substantial variations across the country. For example, in connection with the timing of certain steps, the requirement to undergo mediation, and the possibility of depositing the amount of just compensation as a mechanism to obtain title to the property (so that the project can proceed) before a trial later determines the amount of appropriate compensation.

Practices regarding the payment of attorney fees in condemnation proceeding cases also vary from state to state. In general, if the agency loses, the state has to pay the legal fees. If the property owner loses, the owner pays his/her own legal fees. In Florida, the state pays attorney fees using a schedule based on a percentage of the difference between the first and second offers, as well as all reasonable costs of experts that the owner feels are necessary to establish the value of the property taken (there are no limits on these expert costs). In Colorado, the state pays for a property owner's appraisal in addition to the agency's appraisal. However, the property owner's appraisal has to use the same scope of work and certified appraisers. It is common for states to experience difficulty dealing with reasonable expert and attorney fees because of the lack of an appropriate definition for what constitutes reasonable. As a result, a property owner may hire an attorney, engineers, and other experts, in some cases resulting in fees that are much higher than the appraised value of the property. Unlimited expert fees can be an issue.

Demolish and Dispose Improvements

This activity involves demolishing and disposing structures, buildings, and other developments that were acquired with the property but are not needed for the transportation project. Disposition of improvements is a critical activity, particularly in situations that involve environmental hazards (e.g., asbestos or lead). Nevertheless, disposition of improvements is frequently the responsibility of units within the agency that do not have a right-of-way function (e.g., general services or construction) and, as a result, is typically not described in relevant manuals such as right-of-way manuals. Demolition and disposition of improvements are not addressed in the Uniform Act or 49 CFR 24.

Prepare Right-of-Way Certification

This activity involves preparing a certification documenting that the required real property needed for the project has been acquired or that the acquisition will be complete by a certain date. A relocation certification, which may be prepared separately or combined with the certification above, also documents that all displaced persons have been relocated to decent, safe, and sanitary housing or the state has made available adequate replacement housing to them. Under some unusual circumstances, it may be possible to start construction when possession of a few remaining parcels is not complete but all occupants have had replacement housing made available to them. In this case, the certification must document the affected parcels and the realistic date when physical occupancy and use is anticipated to take place. An encroachment certification, which may be part of the right-of-way certification, may also be prepared to document that the right-of-way is free of unauthorized encroachments, or if they remain temporarily, they will not pose a safety or constructability conflict during construction. Owners of encroaching property must remove those encroachments from the right-of-way. Right-of-way certification requirements are not addressed in the Uniform Act or 49 CFR 24, but they are addressed in 23 CFR 635.309. This certification is usually included in the PS&E package.

Determine Relocation Assistance Eligibility

This activity involves determining whether a person is eligible to receive relocation assistance advisory services and financial assistance.

According to the Uniform Act, a displaced person is a person who moves from real property or moves his/her personal property from real property because of a written notice of intent to acquire or the acquisition of such property, or this person is a residential tenant or conducts a small business, a farm operation, or a business. A displaced person is also a person who moves from real property or moves his/her personal property from real property when there is a permanent displacement activity (e.g., rehabilitation and demolition) under a program or project undertaken by an acquiring agency or with federal financial assistance. The act clarifies that a displaced person is not a person who occupies a dwelling unlawfully or for the purpose of obtaining relocation assistance services, or a person who rents property for a short term or occupies it for a period subject to termination before the property is needed for the project.

A displaced person is eligible for relocation assistance services if he/she is lawfully present in the U.S. A displaced person who is unlawfully present in the U.S. is not eligible to receive assistance services, unless the result is exceptional and extremely unusual hardship for the displaced person's spouse, parent, or child, who is a permanent resident or a citizen of the U.S. The Uniform Act does not explain the process to require persons to move if they are not eligible for assistance due to their unlawful presence in the U.S. According to the act, the acquiring agency may provide advisory services to a nondisplaced person if this person occupies an adjacent property and suffers from substantial economic injury.

According to the Uniform Act, determining relocation assistance eligibility can start early by providing a written notice of intent to acquire property. The act encourages early planning to anticipate displacements and provide for the resolution of problems to minimize adverse impacts on displaced persons and expedite project completion. However, this provision is not prescriptive with respect to timing or level of effort.

49 CFR 24 expands on the requirements in the Uniform Act for determining whether a person is a displaced person

by defining a displaced person as a person who moves from real property or moves his/her personal property as a direct result of the initiation of negotiations. 49 CFR 24 also includes requirements concerning the certification of nationality, residence, or lawful presence in the U.S. of any person seeking relocation assistance services; information needed if the agency believes that a person's certification is invalid; and conditions that are considered to be exceptional and extremely unusual hardship to the spouse, parent, or child of a person who is not lawfully present in the United States. In addition, 49 CFR 24 provides a nonexclusive listing of persons who are not qualified as displaced persons.

Provide Relocation Assistance Advisory (Residential)

This activity involves providing relocation assistance advisory services to displaced persons in connection with residential acquisitions.

According to the Uniform Act, a number of services are available, including, but not limited to, the following:

- Determine and make timely recommendations on needs and preferences of displaced persons for relocation assistance (both residential and non-residential).
- Supply information about other federal and state programs and provide assistance in applying for assistance under those programs (both residential and non-residential).
- Provide other services to minimize or avoid disproportionate hardships to displaced persons in adjusting to relocation (both residential and non-residential).
- Provide information on comparable replacement dwellings for homeowners and tenants.
- If comparable dwelling is not available, identify last-resort housing replacement and take actions as necessary to provide a comparable dwelling.
- Assure person is not required to move without opportunity to relocate to comparable replacement dwelling.
- Help displaced persons understand the notices and other related documentation.

In the case of residential relocations, the focus is on providing sufficient relocation advisory services to minimize the hardship as a result of moving from their current residence, which includes identifying comparable replacement housing. The Uniform Act defines a comparable replacement dwelling to be any dwelling that complies with the following six conditions:

- Decent, safe, and sanitary.
- Adequate in size to accommodate the occupants.
- Within the financial means of the displaced person.
- Functionally equivalent.
- In an area not subject to unreasonable adverse environmental conditions.
- In a location generally not less desirable than the location of the displaced person's dwelling with respect to public utilities, facilities, services, and the displaced person's place of employment.

In addition to the requirements included in the act, 49 CFR 24 provides the following requirements for a comparable replacement dwelling:

- On a site that is typical in size for residential development with normal site improvements, including customary landscaping.
- Currently available to the displaced person on the private market (with some exceptions).
- If a person received assistance from a government housing assistance programs, the rules of that program govern the size of the dwelling.

49 CFR 24 requires a personal interview with each displaced person to explain to him/her the relocation payments and other assistance for which the person may be eligible, the related eligibility requirements, and the procedures for obtaining such assistance. 49 CFR 24 provides the following list of actions that are not mentioned in the act:

- As soon as feasible, inform the person in writing of the specific comparable dwelling, as well as the information and the basis used for determining the upper limit of the housing payment.
- Where feasible, inspect housing prior to being made available.
- Whenever possible, provide minority persons with an opportunity to relocate to decent, safe, and sanitary replacement dwellings that are within their financial means but not located in an area of minority concentration.
- Offer all persons transportation to inspect housing to which they are referred.
- Advise persons who are eligible for government housing assistance about potential requirements of the assistance program, the duration of the rental assistance payment, and the nature of such rent subsidy.

Provide Relocation Assistance Advisory (Non-Residential)

This activity involves providing relocation assistance advisory services to displaced persons in connection with non-residential acquisitions.

According to the Uniform Act, a number of services are available, including the following:

- Determine and make timely recommendations on needs and preferences of displaced persons for relocation assistance (both residential and non-residential).
- Supply information about other federal and state programs and provide assistance in applying for assistance under those programs (both residential and non-residential).
- Provide other services to minimize hardships to displaced persons in adjusting to relocation (both residential and non-residential).
- Provide information on suitable locations for businesses and farm operations.
- Assist businesses and farm operations in obtaining and becoming established at a suitable replacement location.

In addition to these requirements, 49 CFR 24 requires discussing with displaced persons, at a minimum, the following items:

- Replacement site requirements, lease terms, contractual obligations, and other financial considerations.
- Need for outside specialists to assist before, during, and after the relocation.
- Identification and resolution of personal property versus real property issues.
- Estimated time to vacate the property.
- Estimated difficulty in locating a replacement property.
- Potential advance payments and the agency's legal capacity to provide them.

Issue Relocation Payments (Residential)

This activity involves determining payment amounts and issuing payments to displaced persons in connection with residential relocations.

According to the Uniform Act, eligible payments include moving expenses and expenses in connection with purchasing or renting a replacement dwelling, which vary depending on whether the displaced person currently owns or rents, as well as the length of time the displaced person has resided at the displaced dwelling prior to the initiation of negotiations. The act allows moving payments based on actual moving and related expenses or based on a schedule published by the U.S. DOT. In connection with purchasing or renting a replacement dwelling, in 2012 MAP-21 increased relocation payments as follows, based on recommendations from listening sessions for regulatory changes that went into effect in 2005 (*5*):

- Maximum replacement housing payment for displaced property owners: from $22,500 to $31,000.
- Maximum rental assistance payment for displaced tenants: from $5,250 to $7,200.
- Authorization to adjust (by regulation) the amounts above to take into consideration cost of living, inflation, and other factors.

The minimum length of time for a displaced person to reside at a displaced dwelling and qualify for relocation payments is 90 days. Prior to MAP-21, there were two eligibility thresholds (90 days and 180 days). In 2012, MAP-21 eliminated the 180-day threshold for property owners. It is worth noting that the Uniform Act is silent on how to proceed if a homeowner resides at a displaced dwelling for at least 90 days (prior to the initiation of negotiations) and decides to rent instead of acquiring a new property.

49 CFR 24 expands upon these requirements. According to the regulations, fixed residential moving payments must follow the most recent edition of the Fixed Residential Moving Cost Schedule (*68*). The regulations also specify the conditions under which actual cost reimbursements are provided for relocating appurtenances attached to a mobile home that were not acquired and describes the methods to estimate the actual cost for moving personal property from a dwelling or from a mobile home. In addition, 49 CFR 24 clarifies that under certain conditions, displaced homeowners are eligible to receive a rental assistance payment. 49 CFR 24 is also more prescriptive than the act on the procedure for determining replacement housing payments. Interestingly, 49 CFR 24 does not include a provision to insure the mortgage of a comparable replacement dwelling. The Uniform Act does include this option.

Issue Relocation Payments (Non-Residential)

This activity involves determining payment amounts and issuing payments to displaced persons in connection with non-residential relocations.

According to the Uniform Act, two options are possible for payments: (a) reimbursement of actual reasonable moving and related expenses, or (b) a fixed payment. The act allows four types of moving expenses: actual reasonable moving expenses, actual direct losses of tangible personal property (not to exceed the amount that would be required to relocate this property), actual reasonable expenses while searching for a replacement business or farm location, and actual reasonable expenses to reestablish operations at the new site. Which of these moving expenses are eligible depends on whether the relocation involves a small business, a non-small business, a farm operation, or a non-profit organization (Table C-1). In 2012, MAP-21 increased the maximum reestablishment payment from $10,000 to $25,000 and indicated that this upper limit could be adjusted through regulation.

Table C-1. Types of relocation expenses for non-residential relocations according to the Uniform Act.

Non-Residential Relocation	Relocation Expense			
	Actual Moving Expenses	Loss of Tangible Personal Property	Searching for Replacement Business or Farm	Expenses to Reestablish Operations
Small Business	✓	✓	✓	✓
Non-Small Business	✓	✓	✓	
Farm	✓	✓	✓	✓
Non-Profit Organization				✓

The fixed payment option in lieu of payments for actual expenses is possible if the sole business at the displacement dwelling is not the rental of the dwelling to others. The amount is based on criteria established by the U.S. DOT and can range from $1,000 to $40,000, adjustable by regulation. (Note: In 2012, MAP-21 increased the upper limit from $20,000 to $40,000.)

49 CFR Part 24 further expands upon these requirements, providing additional detailed information about relocation expenses that are eligible for reimbursement as well as relocation expenses that are ineligible for reimbursement. 49 CFR 24 also describes the methods to estimate the cost of moving personal property from a business, a farm, or a non-profit organization, as well as related eligible expenses (e.g., establishing connections to nearby utilities, certain professional services, and impact fees or assessments for anticipated heavy utility usage. Examples of ineligible reestablishment expenses include purchase of capital assets, interest on money borrowed to move, and payment to a part-time business that does not contribute materially to the household income. 49 CFR 24 also includes a series of factors that an agency must take into account for determining whether two or more displaced entities constitute a single business that would be entitled to one fixed payment. Separate eligibility criteria are also included in the regulations for displaced farm operations and non-profit organizations.

Property Management

The purpose of this pool of activities is to manage real property for as long as the agency holds those property interests. Property management is a continuous activity that spans complete property lifecycles. Property management functions are typically divided among several areas of responsibility within a state DOT. Examples include:

- **Right-of-way or real estate.** This area of responsibility usually covers the inventory and management of real property interests the state DOT has both inside and outside of the right-of-way, renting or leasing real property interests, and disposal of real property.
- **Maintenance.** This area of responsibility usually covers maintenance and physical protection of real property, access management (including control of access and driveway permits), and accommodation of other facilities (including utility facilities).
- **Finance.** This area of responsibility usually covers asset valuation analyses such as those conducted to address GASB-34 requirements on the value of infrastructure assets (*69*).
- **Finance and planning.** This area of responsibility usually covers lifecycle analyses that result in the identification and documentation of transportation project needs.

Of interest in this report are property management activities that typically involve right-of-way personnel (i.e., inventory and management of real property, renting or leasing of acquired real property, and disposal of real property). At most agencies, right-of-way personnel are not involved in functions that deal with the physical maintenance of the real property, financial reporting, or lifecycle analyses.

Inventory and Manage Property Interests

This ongoing activity involves conducting and maintaining an inventory of property interests as well as managing those interests. The inventory of real property includes not just an inventory of real property but also improvements as well as other items such as machinery and equipment. Management of the property assets also includes maintaining accounting records of receipts and expenses in connection with lease or rental agreements and disposal of acquired real property and related improvements. Examples of real property interests include property held in fee simple (or with some of the rights separated [e.g., mineral rights]), easements of various kinds (e.g., drainage, environmental, utility), leases, licenses, and joint use agreements.

Although state DOTs typically do not own outdoor advertising signs or junkyards, they are responsible for enforcing highway beautification rules and regulations in accordance with the Highway Beautification Act (HBA), as codified in 23 U.S.C. 13, and state laws. The topic of outdoor advertising and junkyard control is outside the scope of this report. Addi-

tional information about rules, guidance, recent research, and best practices is available elsewhere (*70, 71*).

Lease Property Interests

This activity involves leasing real property to others. Examples include leases (including the airspace above as well as space at or below grade), leasebacks (i.e., leases for recently acquired real property back to the owner or tenant who occupied the property at the time of the acquisition), and office space leases. This general category could also include the management of mineral rights, depending on the legal framework and authority to manage these property interests. The ability of a state DOT to lease real property is heavily regulated. For example, leases must normally be at least at the appraised fair market rental value (although there may be exceptions for social, economic, or environmental reasons). It is also common to require that a property be classified as surplus to the state needs during the term of the lease, or that leasing revenue can only be used for eligible activities under the federal-aid highway program. Prior FHWA approval is normally required for leasing real property on interstate highways.

Dispose Property Interests

This activity involves the disposal of real property that is no longer needed for transportation purposes. It also involves disposing non-right-of-way real property. Depending on the situation, disposal of the real property could be to an LPA, an adjoining landowner, or a fee owner (e.g., if the state DOT owned a highway or drainage easement). This activity could also include exchanging real property that is no longer needed with real property that is needed for transportation purposes.

Utility Conflict Analysis, Permits, Relocation, and Reimbursement

The purpose of this pool of activities is to identify utility facilities within the project limits; identify, manage, and resolve utility conflicts; coordinate with stakeholders; develop and execute utility agreements; coordinate and inspect utility relocations; and coordinate utility reimbursement payments and audits.

The Uniform Act includes provisions for reimbursing utility owners for the relocation of their facilities as part of a transportation project. Conditions for eligibility include that the purpose of the relocation should not be to relocate or reconstruct a utility facility, there is an existing agreement between the agency and the utility owner with respect to the use of the right-of-way, and the utility owner incurs extraordinary costs in connection with the relocation. The act defines an extraordinary cost to be a cost incurred by the utility owner that (a) is a non-routine relocation expense, (b) is not included in its annual operating budget, and (c) meets other regulatory requirements. The act also requires that the relocation payment should not exceed the amount of such extraordinary cost, less any increase in the value of the new utility facility above that of the old utility facility (i.e., betterment) and less any salvage value derived from the old utility facility.

Requirements that apply to federal-aid projects regarding the accommodation and relocation of utility facilities are described in 23 CFR 645. State rules and guidelines prescribe minimums relative to the accommodation, location, installation, adjustment, and maintenance of utility facilities on the state right-of-way. Many of these state rules and guidelines are based on model policies and guides developed by AASHTO (*72, 73*). Additional information about the utility coordination process, including the identification and resolution of utility conflicts, is available elsewhere (*74*).

A number of approaches exist to plan and manage utility relocations. In the traditional approach, the transportation agency coordinates relocation activities with utility owners. However, it is also possible for an LPA or another third party to assume responsibility for the coordination of the utility relocation process. Depending on the type of project, type of installation, and other considerations, utility facilities can be relocated on the state right-of-way or be required to find a corridor elsewhere. Utility owners are usually responsible for acquiring their own easements or other real property when moving their facilities outside the state right-of-way. However, if there is a prior right, the utility relocation is normally reimbursable. It is common for utility relocations to require the acquisition of easements, particularly if the relocated utility facility cannot be accommodated within the new right-of-way. Some state DOTs have the authority to acquire property on behalf of utility owners. For example, the Florida DOT has the authority to purchase property on behalf of utility owners, provided there is an agreement with the affected utility owners. Wisconsin has a similar rule. Wisconsin can also execute a common use agreement to perpetuate previous utility owner rights after their facilities are relocated within the state right-of-way. This agreement avoids typical problems that arise with easements.

Collecting accurate utility data from utility owners can be challenging. Typically, agencies send project drawings to utilities with a request to mark up those drawings with relevant utility information. In some cases, utility owners request electronic copies of those drawings in CAD format. Sometimes, utility owners provide electronic as-builts. However, available as-builts are rarely scaled or georeferenced and come in a variety of formats, making it necessary to convert the files to a usable format and adjust their scale and alignment to match the underlying project files. Questions about the completeness and quality of existing utility as-builts prompted

the emergence of the national standard guideline, American Society of Civil Engineers/Construction Institute (ASCE/CI) 38-02 (*74*). This standard guideline outlines typical activities in connection with the collection and depiction of utility data and describes a quality level (QL) attribute for individual utility features identified, as follows:

- QLD involves collecting data from existing records or oral recollections.
- QLC involves surveying and plotting visible utility appurtenances (e.g., valve covers, junction boxes, and manhole covers) and making inferences about underground linear utility facilities that connect those appurtenances.
- QLB involves the use of surface geophysical methods to determine the approximate horizontal position of subsurface utilities.
- QLA involves the determination of accurate horizontal and vertical utility locations by exposing underground utility facilities at certain locations.

Provide Planning and Utility Process Linkages

This activity involves conducting a high-level assessment of major utility facilities that might be affected by the proposed project and facilitating the transition of activities and decisions that pertain to utility impacts to the environmental review, the process to acquire real property for the project, and the utility coordination process. This activity takes place during the planning and programming phase, typically after transportation plans have been developed and project requirements, studies, and cost estimates are under development. It is usually not mandatory but is highly recommended to help identify major utility issues early in the process.

Conduct Coordination Meetings

This activity involves scheduling and conducting agency-level and/or district-level coordination meetings with utility owners. The purpose of these meetings is to provide a forum for discussing upcoming highway construction projects with utility owners, therefore enabling these owners to conduct early fiscal planning and anticipate budget cycle impacts, construction schedules, and consumer service requirements that might be affected by those highway projects. The list of anticipated highway projects should be made available to utility owners prior to those meetings. At this level, master agreements and MOUs can be particularly helpful to develop partnering relationships between the agency and utility owners to promote the goals of collaboration and coordination among stakeholders.

Conduct Preliminary Utility Investigations

This activity involves collecting data from existing records, field visits, or oral recollections and conducting a preliminary assessment of utility impacts on the project. It includes requesting that utility owners provide information about existing installations within the project limits. Typically, the agency sends project drawings to utility owners with a request to mark up those drawings with relevant utility information. Collecting preliminary utility data may also include contacting a one-call notification center to request that utility owners locate and mark existing facilities on the ground. Although it is common to collect this type of information at the beginning of the design phase, it is increasingly common to complete this activity in conjunction with other data collection activities while developing alternative alignments at the beginning of the preliminary design phase. Collecting preliminary utility information is a routine activity, but certifying the corresponding utility data as QLD is more rigorous than traditional practice and is not as common.

After collecting preliminary utility data, agencies conduct an initial assessment of utility impacts, which can result in the first version of a utility conflict table or matrix. The outcome of this activity is an early assessment of utility facilities that potentially need to be adjusted or a determination that additional information is needed.

Survey Visible Utility Appurtenances and Assess Impact

This activity involves surveying visible utility facilities, such as manholes, valve boxes, and posts; correlating this information with existing utility records; and making inferences about underground linear utility facilities that connect those appurtenances. This level of utility investigation typically occurs early in the design phase in conjunction with other data collection activities needed for the production of 30 percent design plans. As with preliminary utility investigations, surveying visible utility facilities is routine, although certifying the corresponding utility data as QLC is more rigorous than traditional practice and is not as common.

After surveying visible above-ground utility facilities, agencies conduct an assessment of utility impacts, which can result in a new or updated utility conflict matrix.

Conduct Detailed Utility Investigations

This activity involves using surface, non-invasive geophysical methods to determine the approximate horizontal location of underground utility installations and/or exposing utility facilities at critical locations (e.g., using vacuum excavation) to survey the horizontal and vertical location of the facilities

at those locations. When used, detailed utility investigations typically occur after the 30 percent design stage if it is critical to obtain more complete, accurate information about underground utility facilities. After collecting non-invasive geophysical data and/or exposing existing facilities at critical locations, agencies conduct an assessment of utility impacts, which can result in a new or updated utility conflict matrix.

Using geophysical methods to assist in the depiction of underground utility facilities is increasing if it is critical to obtain more complete, accurate information about underground utility facilities. QLB data collection is still not very common, for reasons that range from data collection costs to lack of knowledge about the benefits that better utility facility data can offer in the form of lower project costs or decrease or elimination of utility conflicts, particularly during construction.

The purpose of exposing utility facilities at critical locations is to obtain location information to a level of accuracy (i.e., QLA) which is sufficient for developing plans and profiles and making final design decisions. Some states use vacuum excavation to expose utility facilities and survey the horizontal and vertical location of the facilities at those locations but do not certify the resulting data as QLA.

Coordinate Utility Relocation Design with Utility Owners

This activity involves coordinating with utility owners in all aspects leading to the identification and design of utility conflict resolution measures. It also involves providing a notification to utility owners when relocating one or more of their facilities is necessary for the transportation project, and includes provisions such as required documentation from both parties and dates by which critical milestones must be complete. Utility owners are typically responsible for the design to relocate utility facilities that are in conflict with the project or other facilities. However, it is the utility coordinator's responsibility to ensure that lines of communication between utility and transportation project designers are open, design documents are exchanged quickly and efficiently, coordination meetings are scheduled and conducted, and agreement documents are processed in a timely manner. Utility coordination activities also involve LPAs in cases where LPAs are responsible for coordinating utility relocations with utility owners.

Under certain conditions, it may be possible to obtain an early authorization to conduct utility work to enable the agency to incur certain costs before the normal authorization to acquire real property or prior to the completion of the environmental document. Examples of activities that may be allowed include engineering, prefabrication of materials, and acquisition of easements, i.e., activities that do not involve excavation or disturbance of the soil. An early authorization to conduct utility work requires the final geometric schematic to be complete.

Prepare and Execute Utility Agreements

This activity involves preparing and executing agreements with utility owners, typically for the relocation of utility facilities that are eligible for reimbursement. For non-reimbursable utility relocations, it is also possible to execute agreements. However, it is more common to use existing utility permitting procedures. Utility agreements outline the conditions that govern the accommodation of utility facilities within the state right-of-way and specify each party's rights, responsibilities, and timelines with regard to required utility relocations, as well as procedures that apply if an agreement to relocate is not reached. Utility agreements typically include standard agreement forms and attachments, utility relocation plans, cost estimates, and other supporting documentation.

Utility agreements can be executed as soon as the method of utility conflict resolution has been identified, typically after 60 percent design (when critical project design elements such as drainage have been substantially completed). However, executing utility agreements earlier is encouraged whenever possible. A goal at most state DOTs is to execute all utility agreements by the time the project design is complete.

Monitor Utility Relocations and Reimburse Utility Owners

This activity involves monitoring and inspecting the progress of utility relocations in the field and processing requests for eligible reimbursable items from utility owners. Utility relocation costs are typically classified as project right-of-way costs. A goal at most state DOTs is to have utility relocations completed by the time the project design is complete (or by letting date). However, it is common to have pending utility relocation items at the beginning of construction.

Utility relocation items are frequently included in the highway contract (e.g., in the case of water or sanitary sewer lines, duct banks, manholes, and junction boxes). If the items are not reimbursable, it is common to request advance payment from the utility owners so that the state DOT can pay the highway contractor for the utility relocation items.

Prepare Utility Certification

This activity involves preparing a utility certification for inclusion in the PS&E package, which documents either that the utility coordination and relocation process has been finalized or that there are pending utility relocations. Frequently, state DOTs provide additional information such as utility

conflict location and status as well as utility owner contact information. Utility certification requirements are addressed in 23 CFR 635.309.

Letting

The purpose of this pool of activities is to process the PS&E package, advertise the project for construction bids, receive contractor bids, evaluate offers (which includes activities such as detecting collusion and comparing bids against the engineer's estimate), select the winning bid, award the contract, notify the public in advance of construction, and store and retain project records. Letting could also include pre-bid meetings to provide specific project information, explain any unusual aspects of the project, and address potential bidder questions.

Let Project

This activity involves scheduling and completing all the necessary steps to select the contractor for the project. Steps usually include advertising the project for construction bids, receiving contractor bids, evaluating the offers (including items such as detecting collusion and comparing bids against the engineer's estimate), selecting the winning bid, awarding the contract, notifying the public in advance of construction, and storing and retaining project records. One or more pre-bid conferences may be necessary to provide specific project information to bidders and address bidder questions.

Construction

The purpose of this pool of activities is to build and deliver the project to the agency. Examples of activities include:

- Schedule regular construction meetings, including a preconstruction meeting to establish working relationships; determine the responsibilities of contractors, subcontractors, and agency personnel; and agree on detailed arrangements for the completion of the contract.
- Inspect the construction site to determine if the contractor's performance follows the construction contract. Inspections include identification of defective and unauthorized work.
- Maintain project records such as progress schedules, project diaries, materials received, temporary suspension or resumption work notices, working day charges, contractor labor payrolls, and change orders.
- Monitor and respond to contractor requests for information.
- Manage the review and approval of potential project change orders. Change orders can have real property impacts if the change requires acquisition of additional real property or makes some previously acquired property unnecessary.
- Communicate and coordinate with affected stakeholders, including property owners who are adjacent to the project site. This activity also has right-of-way function implications.
- Prepare as-builts.
- Deliver project to agency.

Conduct Preconstruction Meeting

This activity involves scheduling and conducting a preconstruction meeting with the selected contractor after the agency has awarded the contract and a notice to proceed has been issued. The purpose of the meeting is to establish lines of authority and communication; determine the responsibilities and duties of contractor's personnel, subcontractors, and department personnel; clarify potential sources of misunderstanding; and work out the detailed arrangements necessary for the successful completion of the contract. In addition to agency and contractor personnel, attendees might include utility owners and resource agencies (e.g., if the project includes conditional permits that require resource agency notification). Depending on the project, participants might also include news media, LPAs, and emergency services such as fire departments and law enforcement.

Build and Deliver Project

This activity involves all the necessary activities to build and deliver the project. In addition to the activities mentioned above, examples of typical construction-level activities include:

- Conduct construction activities.
- Inspect the construction site to determine if the contractor's performance follows the construction contract.
- Maintain project records such as progress schedules, project diaries, materials received, temporary suspension or resumption work notices, working day charges, contractor labor payrolls, and change orders.
- Monitor and respond to contractor requests for information.
- Manage the review and approval of potential project change orders.
- Communicate and coordinate with affected stakeholders, including property owners who are adjacent to the project site.
- Deliver project and prepare as-builts.

Project Management

The purpose of this pool of activities is to manage the project throughout its lifecycle (i.e., from the time the project was identified during planning and programming to the completion of the construction phase and finalization of all the project closeout activities).

Establish Project Management Team

This activity involves establishing a project management team by identifying key project team members from various disciplines, including a representative from the right-of-way unit. It is recommended that this team be formed early in the project development process and remain in place throughout the project lifecycle (i.e., from "cradle to grave") to provide coordination and direction to project efforts. The project management team also acts as a point of continuity as the project proceeds across the various project phases and different team members join the project. The project management team is responsible for providing overall guidance and direction to the project and for facilitating key project decisions. The members of the project management team are also responsible for ensuring that the appropriate resources from the different disciplines are available and engaged on the project when needed. This team would also be responsible for monitoring and facilitating resolution of issues that are multidisciplinary in nature.

Manage Project Development and Delivery Process

This activity involves ongoing engagement and participation in project activities throughout the project lifecycle, including required support during the construction and post-construction phases until the project has been closed out. From a right-of-way perspective, this activity requires everyone from the right-of-way representative to the project management team to remain actively involved in the project through participation in project status meetings and other appropriate meetings and review sessions, to be available as needed to construction staff on an advisory basis, and to engage other right-of-way staff to work on the project as needed.

Abbreviations and acronyms 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