2018

RISK MANAGEMENT AND PRACTICE ALIGNMENT FOR UTILITY COORDINATION ON TRANSPORTATION PROJECTS

Roy E. Sturgill Jr.
University of Kentucky, roy.sturgill@uky.edu
Author ORCID Identifier:
https://orcid.org/0000-0002-0702-8351
Digital Object Identifier: https://doi.org/10.13023/etd.2018.412

STUDENT AGREEMENT:

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Roy E. Sturgill Jr., Student

Dr. Gabriel B. Dadi, Major Professor

Dr. Timothy R. B. Taylor, Director of Graduate Studies

RISK MANAGEMENT AND PRACTICE ALIGNMENT FOR UTILITY COORDINATION ON TRANSPORTATION PROJECTS

DISSERTATION

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the College of Engineering at the University of Kentucky

By
Roy Everett Sturgill, Jr.

Lexington, Kentucky

Director: Dr. Gabriel B. Dadi, Professor of Civil Engineering

Lexington, Kentucky

2018

ABSTRACT OF DISSERTATION

RISK MANAGEMENT AND PRACTICE ALIGNMENT FOR UTILITY COORDINATION ON TRANSPORTATION PROJECTS

Utility coordination is an exceedingly complex effort of managing, communicating, and facilitating the avoidance and relocation of utility facilities as needed for highway projects. Utility coordination occurs throughout the design and delivery of a project and best practices are used to make sure this occurs efficiently and in the best interest of the public, who are not only the taxpayers but also the ratepayers. Recent research has attempted to enhance utility location technology and procedures, instill frameworks and tools for utility coordination, and proceduralize risk management relative to utility coordination. However, research attempting to improve various aspects of utility coordination simultaneously has led to a lack of consensus on how to integrate these research efforts into an effective standard of practice. There is also not a standard of practice for quantifying utility related risks for transportation projects.

This research attempts to build consensus and contribute to the body of knowledge in the area of utility coordination by presenting an approach to assess the relative utility risks of a project and align current and new practices to minimize those risks. Through statistical analysis of historical project data regarding utility coordination schedules and costs for transportation projects in Kentucky, this study was able to produce a model that estimates utility related risk early in transportation project development. With input and evaluation by subject matter experts, utility coordination best practices were collected and aligned to utility risks on transportation projects. A decision support tool was developed to assist in the use of the mathematical utility risk model and the best practices associated with the varying risk levels.

This research also finds that there are disparities among utility stakeholders on transportation projects in regard to the effectiveness or satisfaction with particular best practices. This finding presents the need for early involvement and collaborative utility coordination to select practices that ensure utility related issues on transportation projects are minimized. The research also presents that increased use of alternative contracting methods can pose significant challenges to utility coordination on transportation projects. This stems from the finding that utility coordination practices were not uniformly effective across these varying procurement methods. Furthermore, as Departments of

Transportation continue to deal with resource issues, one of which being manpower within utility coordination, the use of consultants for utility coordination presents its own set of complexities. The research finds the best application of consult-led utility coordination is through third-part consultants specializing in utility coordination, those who have been state-specifically trained for utility coordination, and prequalified for utility coordination work.

KEYWORDS: Utility Coordination, Utility Engineering, Utility Conflict Management, Transportation Project Development, Utility Relocation

Roy Everett Sturgill, Jr.

10/12/2018
Date

RISK MANAGEMENT AND PRACTICE ALIGNMENT FOR UTILITY COORDINATION ON TRANSPORTATION PROJECTS

By

Roy Everett Sturgill, Jr.

Gabriel B. Dadi

Director of Dissertation

Timothy R.B. Taylor

Director of Graduate Studies

10/12/2018

Date

This doctoral dissertation is dedicated to my son, Tripp (Roy, III), my wife Jennifer, my parents, Roy, Sr. and Monnette, my sisters and my extended family for their constant support and encouragement. For no matter what we do, we do it as a team.

ACKNOWLEDGEMENTS

This has been a long journey. Fifteen years of fits and starts, but all the while I have been surrounded by people who wanted nothing but the best for me. As this chapter of the journey comes to an apparent close, I am drawing to mind all of those kind folks who believed in me more than I believed in myself, who encouraged me when I was defeated, and who strengthened me when I was weak. I cannot possibly thank everyone individually but please know, those of you who worked with me and supported me whether I was at Virginia Tech, the Kentucky Transportation Cabinet, or the Kentucky Transportation Center at the University of Kentucky, I truly appreciate you.

To Gabe and Tim, I do not know where the next chapter of this story goes, but we made a great team and had some wonderful accomplishments. Whatever lies ahead, I know we will continue to be colleagues, friends, and partners continuing the work we have begun and in securing future endeavors. One thing we have surely proven is when no one is out for himself or herself, everyone can benefit. Thank you for the big push to get me through.

To my parents, words cannot express the thanks and gratitude owed to you. You have provided constant support without expectation. Without pressuring me, you somehow motivated me beyond what I ever thought possible. I always wanted to make you proud, even when I knew you were already proud of me. I could not fathom anything more than what you have already provided for me. I only hope that Tripp will someday appreciate Jenny and I as much as I appreciate you. I love you and thank you.

To Jenny, we made it! Through it all, you have been by my side. From the mountains of Virginia to the rolling hills of Kentucky, you supported and encouraged me. This work would not be possible were it not for your encouragement and extra parenting and housekeeping efforts to allow me time to see it through. Through these years, the boundaries of what is me and what is us have truly faded. This is not my accomplishment, this is our accomplishment. I love you and appreciate you and I have no fear about what lies ahead because whatever it is, I know we will face it together.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

1.1. Background and Motivation

Infrastructure consists of organized facilities and structures that facilitate the movement and transmission of resources. It is the backbone of our society and its economy. Infrastructure provides opportunities for transactions and a way of life, from transportation via passenger car to communication via electronic messaging. While highways and utility transmission or distribution facilities (e.g., electric, gas, fiber-optic) seem to differ significantly, in fact they are quite similar in that each is instrumental for providing services expected by the public. The facilities also frequently share a physical location. The co-location of utilities within and near road rights-of-way (ROW) presents challenges to state departments of transportation (DOTs) when existing highway facilities are rehabilitated or new routes constructed. In these instances, DOTs must work with utility owners and other project stakeholders to avoid utility facilities, or they must coordinate the reconfiguration of facilities in order accommodate improvements to the highway system. There are likewise projects where utility owners install or upgrade facilities that require coordination with DOTs. All of these projects can involve a complex coordination effort among multiple agencies, public and private, each of which has different missions, funding sources, and stakeholders. At times, these issues lead to delays in the lifecycle of highway and utility projects alike. Some may argue there is reason for DOTs to disallow accommodation of utilities within their ROW, but accommodating utilities on public ROW is viewed as a beneficial practice for the ratepayers who are also the taxpayers.

The justification for having utility and transportation facilities share real estate (utilities within transportation ROW) is to provide services to the public in the most economical means possible. The Federal Highway Administration (FHWA) and other entities have consistently made this argument (Thorne, et. al., 1993, Anspach, J., 2010). To realize these benefits without harming utility or transportation projects, effective utility coordination is essential. Due to a lack of uniform utility coordination terminology and process standardization across and within DOTs, utility coordination has become a very broad and ambiguous term. Additionally, *effective* utility coordination can be an even more varied term. DOTs handle utility coordination processes differently and may even coordinate utilities differently themselves within different business units. Such variances are permissible under Federal Regulations (23 CFR 645 and specifically, Subpart B, Subsection 645.211). As noted in the *Program Guide: Utility Relocation and Accommodation on Federal-Aid Highway Projects*, the definition for *utility* for the purposes of determining reimbursement for relocation is broad in scope and relies on the individual state laws to determine if a facility is treated as a utility (2003). Hence, because state laws vary, the definition of a utility varies among states. The classic example is that some states consider cable television a utility while others do not. A key definition presented here to build consensus in understanding this work is that of *utility coordination*. In this dissertation, utility coordination refers to the active effort to communicate, share information, and interact productively with all applicable stakeholders regarding the utility involvement, adjustment, and relocation during all phases (planning, design, construction, operation, and maintenance) of the development and delivery of a transportation project (Thorne, et. al. 1993).

Within transportation, utility coordination encompasses the management, communication, and facilitation of avoidance, minimization, or relocation of utility facilities to mitigate impacts between utility facilities and highway projects. Utility coordination is ongoing throughout the design and delivery of a project, and best practices are used to make sure it occurs efficiently and in a manner that aligns with the best interest of the public — taxpayers and ratepayers.

Commonly accepted focal areas of utility coordination include:

- Providing communication, identification, and engineering expertise relative to utility and transportation project interaction;
- Minimizing utility and transportation project impacts;
- Determining and initiating relocations; and
- Reimbursing relocations and disturbances as applicable according to complex and nonstandard (varying from state-to-state) regulations.

Effective utility coordination can improve the delivery of transportation and other capital facility projects while reducing project risks posed by delays, safety hazards, and cost overruns. Utility coordination entails agreements, estimates, risk identification and management, reimbursements, and all other terms associated with these interactions. In its most effective approach, utility coordination minimizes impacts to both the transportation project and utility facilities.

Utility coordination can significantly affect timelines, budgets, risks, and stress associated with the delivery of a transportation project. Many strategies have been developed to optimize these efforts. Recent research has attempted to enhance utility location technology and procedures, articulate a framework that includes tools for utility coordination, and proceduralize risk management relative to utility coordination. However, there is little consensus over how to best integrate the outcomes of these research efforts into an effective standard of practice. This dissertation attempts to build consensus in this area and contribute to the literature on utility coordination by presenting an approach to (1) assess a project's relative utility risks and (2) align current and new practices to minimize those risks.

In addition to the changing practices for improving utility coordination, many other utilities-related changes are unfolding simultaneously. First, the American Society of Civil Engineers (ASCE) created the Utility Engineering and Surveying Institute (UESI) in October of 2015. One of its initial goals was to establish a consensus definition for Utility Engineering (ASCE, 2017):

> "Utility Engineering is a branch of Civil Engineering that focuses on the planning, design, construction, operation, maintenance, and asset management of any and all utility systems, as well as the interaction between utility infrastructure and other civil infrastructure." (UESI, 2018)

The impetus for establishing and defining the field of Utility Engineering field stems from the other related changes occurring. These include the increase of utilities facilities being placed underground, rapid technological advancement (and therefore increase in cost of conflicts) in the telecommunications sector (fiber optic cables, small and microcellular facilities, and forthcoming 5G cellular technology), increased use and misuse of subsurface utility engineering (SUE, a system for locating underground utilities), and advances in placement technologies such as horizontal directional drilling (HDD). Concurrent advancements in location technologies have emerged related to ground penetrating radar (GPR) and electromagnetics, among other devices, but these advances necessitate deeper understanding in the technologies, geophysics, and limitations of these devices. Some of these issues are partially responsible for prompting the current revisions to the ASCE standard 38-02, which outlines SUE practices. Anecdotal rules of thumb have postulated that location technologies are only able to accurately find up to 90% of the known utilities in a project footprint; and yet, due to substandard practices in utility as-built records only 80% of what might be in a project footprint is known. Resource issues and constraints — both monetary and personnel related — have been factors for both DOTs and utility companies, increasing the complexity of utility coordination. Changing legislation and requirements, such as the Buy America Act, have also complicated utility coordination and relocation lead times. These challenges have been further exacerbated by the trends of Alternative Contracting Methods (ACMs), which compress project schedules — specifically the project phases where critical utility coordination and relocation work occur. Because many aspects of utility coordination and utility engineering are in flux, understanding the risks of utility coordination and the implications of best practices designed to mitigate those risks is critically important.

1.2. Problem Description

The challenges listed in Section 1.1 and the growing complexity of utility infrastructure, along with the other mentioned factors that slow processes in utility coordination and relocation, has increased the urgency of understanding project-based risks associated with utilities and the need for early and informed utility coordination decisions (e.g., facility avoidance). This coupled with the ever-increasing needs of the infrastructure in the United States suggests the potential of increased utility and highway interactions and resulting project impacts. Utility owners and DOTs must achieve a better mutual understanding of the risks associated with their interactions.

Two factors that contribute to inefficiencies in the management of utility issues on transportation projects include the lack of accurate and complete information about utility facilities that might be in conflict with the project and the resolution and overall management of those conflicts. These inefficiencies entail many risks to projects, and utility issues are frequently cited as one of the top reasons that highway and other capital improvement transportation projects experience delays or cost overruns. In Kentucky, the DOT of which constitutes a primary focus of this dissertation, a study reviewing project change orders found that the *Utility Issues* change order reason code ranked 9th out of around 30 codes reviewed. Although such a ranking would not seemingly indicate that utility issues severely and routinely affect projects, further analysis demonstrated these issues increase construction costs by 3.16% — on average about $34,500 per change order (Goodrum, et. al., 2010). Assuming design costs account for 10% of construction costs and utility the phase constitutes 10% of the design costs, resolving utility issues prior to construction would produce a 316% return on investment. Not only does this support the idea captured in Figure 1.1, it further corroborates the importance of understanding utility risks as early as possible in the project and managing and mitigating those conflicts before construction if possible.

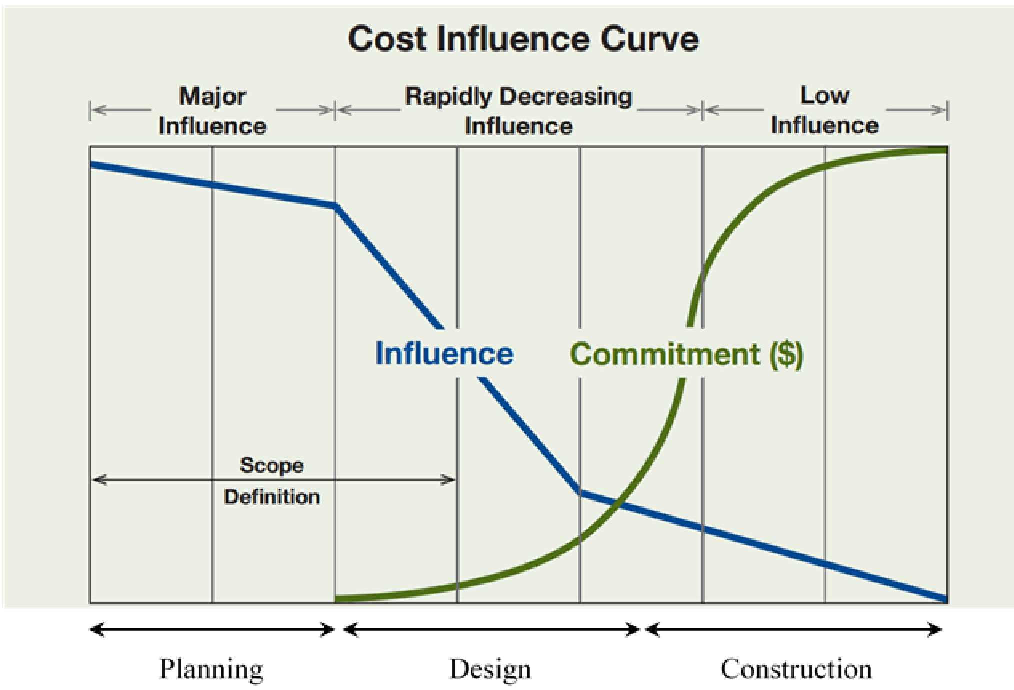


Figure 1.1: Cost Influence Curve Adapted from the Construction Industry Institute, Building on 25 Years

There are several dimensions of utility risk management during project development and delivery. Examples include risks attributable to uncertainties in utility location (X, Y, and Z); operational characteristics (e.g., pressure, capacity, and operational status); structural characteristics and performance (e.g., soil and bedding characteristics, facility materials, strength, resilience); work schedule (e.g., utility conflict management, coordination, constructability, construction phasing, traffic control, damage prevention, worker safety, cost management, and billing); and costs (e.g., preliminary estimates, local participation, funding availability). Each dimension can affect a DOT's ability to deliver projects on time and within budget. A recent survey of state DOTs found that highway project managers and designers frequently do not grasp the level of risk they are absorbing related to existing or potential utility conflicts. Effectively mitigating these risks requires a coordinated effort, including early involvement within the DOT (between design and utility coordination business units) and between the DOT and utility owners. There can also be a lack of communication and cooperation between the design and utility coordination segments within a DOT (Sturgill et. al., 2017). These added complexities further validate research focused on understanding and mitigating utility risks associated with highway projects.

Additionally, there has been a trend among some DOTs to use consultant-led utility coordination. The structure of this arrangement varies in that the consultant conducting the utility coordination may be the project design consultant or a standalone consultant strictly for utility coordination. This trend has emerged due to lack of resources at DOTs, and there has been greater satisfaction in standalone utility coordination consultants (Sturgill et. al., 2017). Regardless, this is a relatively new approach to utility coordination and clearly influences the risks and risk mitigation in utility coordination. This research will inform consultants performing utility coordination of the utility risks a project poses and best practices to mitigate those risks. The nuances of consultant-led utility coordination and potential impacts to the use of mitigation strategies are addressed as well.

The growing use of alternative contracting methods (ACMs) has also impacted utility coordination. Work from the Design-Build Institute of America demonstrates that over half of all states now fully authorize design-build procurement (Figure 1.2) (DBIA, 2015).

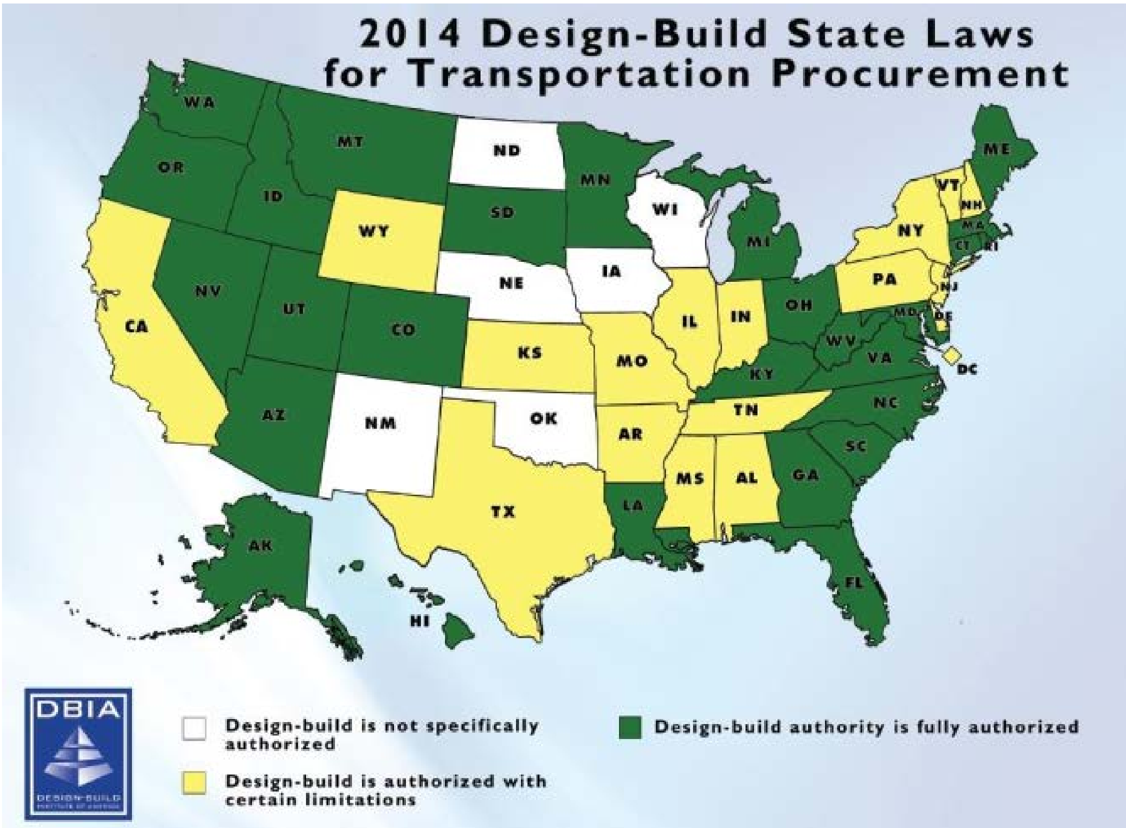


Figure 1.2: Design-Build Transportation Authorization

Similar tendencies have been identified for Construction Management at Risk and Public Private Partnerships according to the Associated General Contractors (Figures 1.3 and 1.4) (AGC, 2015).

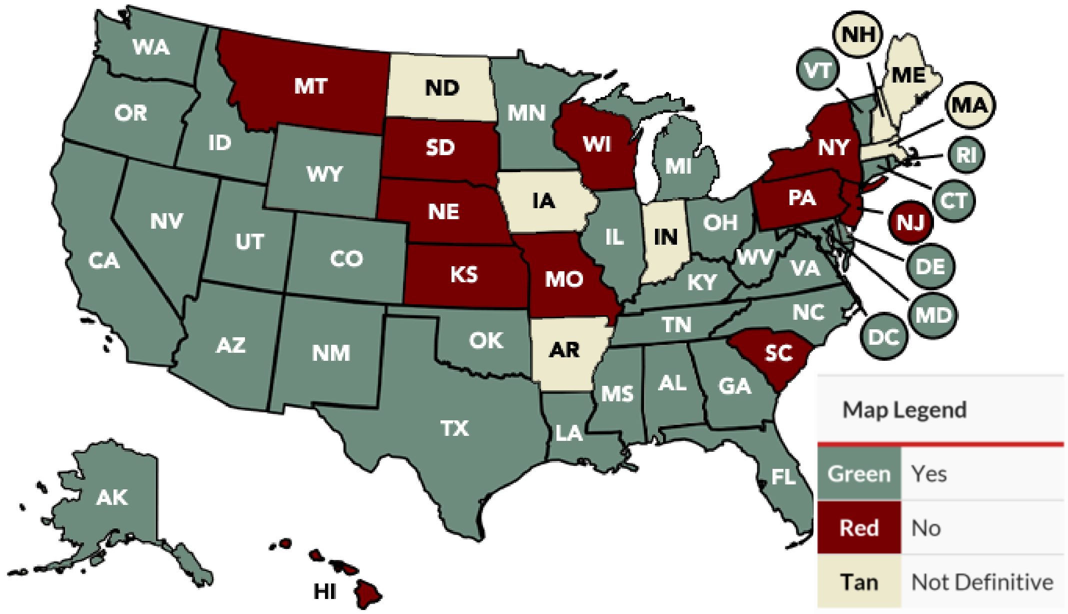


Figure 1.3: Law Authorization of Construction Manager at Risk for Transportation

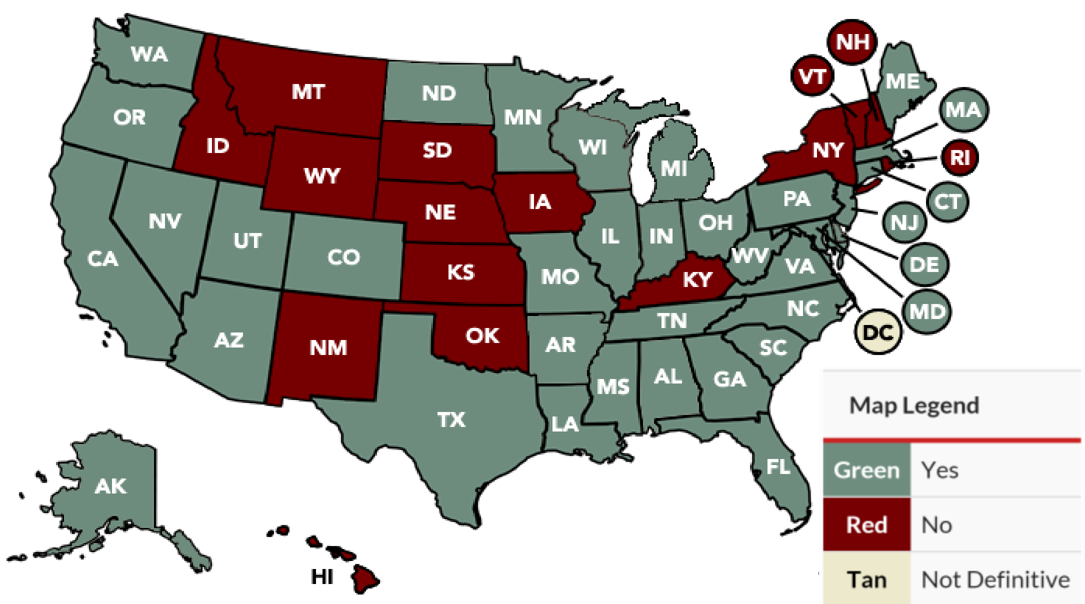


Figure 1.4: Law Authorization of Public Private Partnerships for Transportation

With many states trying if not adopting ACMs, many challenges associated with the application of legacy practices have become apparent. This research shows that practices regarded as effective for design-bid-build may be less effective when paired with ACM approaches.

In summary, tools are beginning to emerge to assist with the management of utility-related risks. However, these are mostly generic project management tools and do not take into account the many nuances pertaining to utility data collection, utility accommodation, coordination, relocation, and project scheduling requirements. For example, 3D CAD software now includes clash detection capabilities to identify locations where existing or proposed features might be in conflict. However, simply knowing about the existence of a conflict does not necessarily communicate the full extent of the utility risk involved. Current knowledge gaps prevent DOT project teams from assessing utility-related risks thoroughly enough to apply risk mitigation strategies that will improve the delivery of highway projects. Estimating utility-related risks in early project development stages can assist project teams in effectively managing utility conflicts within these projects using specifically aligned utility coordination practices. Additional nuances inherent to the application of these practices mean the use of ACMs or consultant-led utility coordination may detrimentally impact their effectiveness.

1.3. Scope and Objectives

This research develops and presents tools and methodological approaches to quantify and manage the critical elements of utility risk that affect highway project development and delivery. Project managers will be able to use these tools and methodologies to quantify, document, and make informed decisions about uncertainties and risks in the management of utility conflicts. The research focuses on the most critical dimensions of utility-related risk because of their significant impact on project delivery costs and schedules. Specifically, it targets risks attributable to utility facility locations, coordination and relocation schedules, and utility relocation costs. Although other dimensions of risk are examined where warranted.

Utility Conflict Matrices (UCM; also referred to as Utility Conflict Management) capture information-rich data regarding utility conflicts on highway projects. These data have not been recorded previously or historically collected as in using these types of systems. Organizing data using UCMs provide for the more accurate categorization and quantification of utility risks. This project looks at the use of UCM data to better assess project utility risks.

This research (1) outlines quantitative metrics that can be used to assess utility coordination risk, (2) provides a framework/guidance through which effective utility coordination practices can strategically leveraged, and (3) highlights the impacts of the use of ACM and consultant-led utility coordination on the implementation and efficacy of this framework/guidance. Aside from limiting the research's scope to the previously mentioned critical risks, the research entails several phases of project development and delivery. Evaluating highway project utility risks and strategically applied risk mitigation strategies represents a significant contribution to the existing literature on utility coordination.

1.4. Significance

This document presents DOTs with an approach to risk evaluation and guidance to assess and mitigate utility coordination risks. Agencies putting this approach into use will see positive effects on the schedule, budget, and overall risk of transportation projects. Effective utility coordination can have a $4-to-$1 return on investment (NHI, 2016). However, there is little rigorous work focused on maximizing these returns and strategically applying effective utility coordination practices according to project risks. This work provides much-needed guidance on utility coordination.

Transportation agencies will be able to use risk assessment and management tools presented in this document to more accurately communicate and coordinate utility mitigation and relocation efforts on highway projects. Equipped with these tools, all stakeholders can better utilize their resources. This in turn will provide opportunities for improved utility risk mitigation. Potential benefits include:

Enhanced communication of risk among designers, utility coordinators, and utility companies across various project stages.

Development of systematic and programmatic methods for quantifying and revising the utility risk status of projects.

Assistance in applying resources based on quantified risks to mitigate and minimize cost, schedule, and other resource impacts from utility conflicts.

Improved utility coordination for all stakeholders.

A number of previous and ongoing research projects have spoken to the issues of utility conflicts and conflict tracking and management systems including:

- NCHRP Synthesis 405—Utility Location and Highway Design;
- ACRP Synthesis 34—Subsurface Utility Engineering Information Management for Airports;
- SHRP2 R01A—3D Utility Location Data Repository;
- SHRP2 R01B—Utility Investigation Technologies;
- SHRP2 R15A—Strategies for Integrating Utility and Transportation Agency Priorities in Renewal Projects;
- SHRP2 R15B—Identifying and Managing Utility Conflicts;
- FHWA-HRT-16-019—Feasibility of Mapping and Marking Underground Utilities by State Highway Agencies;
- TxDOT 0-5475—Development of a Utility Conflict Management Tool;
- TxDOT 0-6756—Evaluation of Costs to Process and Manage Utility and Driveway Permits;
- KYTC KTC-14-15/SPR460-13-1F—Methods to Expedite and Streamline Utility Relocations for Road Projects.

These efforts are beginning to standardize and record information in a way that furthers the ability to quantify a project's utility-related risk. Nevertheless, more work on the quantification of risk and the alignment of mitigation strategies is needed.

This research provides DOTs with salient information and guidance relative to utility coordination and inherent risks. Project data and data collected within early UCMs are analyzed to quantify risks and assess the viability of this approach. The research also aligns best practices with utility risk mitigation strategies. Additionally, the work addresses the use of ACMs and consultant-led utility coordination and the implications these approaches have on typically used utility coordination effective practices.

1.5. Dissertation Style and Organization

This dissertation uses a manuscript style format: an introductory chapter followed by three manuscripts (suitable for submission/publication in an academic journal), and a conclusion. The manuscripts focus on the developing an approach to assess and quantify utility related risks on highway projects, aligning mitigation measures to those risks, and distinguishing areas where this guidance should be varied in order to address the contingencies of ACMs or consultant-led utility coordination. Specially, each manuscript addresses the following topics:

- Article 1 — Demonstration of risk assessment in utility conflicts with highway projects;
- Article 2 — Collection and alignment of effective utility coordination practices to mitigate and minimize identified risks,
- Article 3 — Assessment of utility coordination practice alignment during use of ACMs or consultant-led utility coordination.

This chapter has introduced the topic area, provide research background, outlined the problem statement and objectives, and presented the organization of the dissertation. Chapter 2 presents a focused literature review on the assessment of utility risks on highway projects, the research approach for assessing utility- related risks relative to project cost and schedule impacts, a quantitative tool for assessing utility-related risks specific to the Kentucky Transportation Cabinet (KYTC), and key conclusions. Chapter 3 reviews best practices to minimize and mitigate utility related risks on highway construction projects, describes those best practices considered effective by varying stakeholder groups and in rank order, and presents an alignment of effective practices for the risk assessment approach elaborated in Chapter 2 for KYTC. Chapter 4 begins with a discussion of consultant-led utility coordination and utility coordination with alternative contracting methods. This section will be limited due to the limited availability of information tailored to this specific niche of study. This chapter will also present findings from cases and survey questions specific to the topic and summarize findings on the risks and effective practices related to the use of consultant-led utility coordination or ACMs. Chapter 5 reviews the key findings outlined in the previous three chapters and offer some broad conclusions. Appendices contain references, a professional vita, interview questions, survey results, and statistical analyses.

CHAPTER TWO: QUANTIFYING UTILITY RISK IN HIGHWAY PROJECT DEVELOPMENT

2.1. Introduction

The co-location of utilities within and near road rights-of-way (ROW) presents challenges to state departments of transportation (DOTs) when they rehabilitate existing highway facilities or construct new routes. These challenges include risks to the schedule and the costs of highway projects either during design or construction. DOTs must work with utility owners to avoid, minimize, or mitigate these risks to accommodate highway system improvements as efficiently as possible. The justification for having utility and transportation facilities share real estate (utilities within transportation right-of-way) is it enables provision of services to the public in the most economical means possible. This argument has long been promulgated by the Federal Highway Administration (FHWA) and other sources (Thorne, J., et. al., 1993, Anspach, J.H., 2010). To realize these benefits without detrimentally impacting utility or transportation projects effective utility coordination (i.e., effective utility risk) management is essential.

The main factor which contributes to utility-related risks on transportation projects is the lack of accurate and complete information regarding utility facilities that potentially conflict with the project. Utility engineering and coordination focuses on resolving and managing these conflicts, as they can produce inefficiencies and increase the risk of schedule delays or cost overruns.

Utility risks are influenced by many factors, including uncertainties in location, operational characteristics (e.g., pressure, capacity, operational status) structural characteristics (e.g., material, bedding, strength), utility company priorities and schedule (e.g., service outage limitations, system upgrades, long-lead design or fabrication, phased construction limitations, damage prevention needs) and costs (e.g., cost estimate accuracy, funding availability, company fiscal constraints). Each of these risks affects a transportation agency's ability to deliver projects on time and within budget. Qualitative feedback consistently indicates that project managers and designers often fail to understand the level of risk they are absorbing. Existing utilities are generally delineated on design documents to assist designers in understanding the physical characteristics, availability, and restrictions of the project site, however, the accuracy of this information is not categorized or explained for the designer. Although standards exist (e.g., ASCE/CI 38-02) for providing a confidence levels of the quality of the information gathered in the field, they do not specify quantitative measures of risk (CI/ASCE 38-02, 2002). All utility risks require management through utility coordination, which is conducted within restrictive legislative requirements.

Effective utility coordination and risk management can improve the delivery of transportation and other capital facility projects and reduce project risks posed by delays, safety hazards, and cost overruns. Utility coordination encompasses agreements, estimates, risk identification and management, reimbursements, and all other elements associated with these interactions. Utility coordination is at its most effective when it minimizes impacts to the transportation project and utility facilities (Sturgill, et. al., 2017). Many resources are available to support effective utility coordination, yet the process requires significant time and personnel commitments. Funding and resource cutbacks at state DOTs are increasing the magnitude of challenges associated with utility coordination (Taylor and Maloney, 2013). Utility coordination and relocation activities demand considerable effort and interaction with other project activities, which might affect an agency's ability to deliver a project on time and within budget. Having an estimate of a project's utility risk at hand can help prioritize the use of utility coordination resources.

2.2. Problem Description

Some tools have been developed to assist with the management of utility risk. However, these are generally generic project management (Utility Conflict Management) tools and do not give project managers an assessment of risk early enough in project development to prioritize utility coordination efforts. Increasingly complex utility infrastructure combined with other factors that slow down the utility relocation process has increased the urgency of understanding project-based risks associated with utilities as well as the need for early and informed utility coordination decisions (e.g., facility avoidance).

These issues coupled with the ever-increasing needs of the infrastructure of the United States alludes to the potential of increased utility and highway interactions and resulting project impacts. Utility owners and DOTs must have methods and tools to better understand the risks associated with their interactions.

Recent work investigating utility coordination practices at state DOTs has found that highway project managers and designers frequently do not apprehend the level of risk projects absorb from utility-related issues (Sturgill, et. al., 2017). Effectively mitigating these risks requires coordinated efforts within transportation agencies (between design and utility coordination segments) and between DOTs and utility owners. Inadequate communication and cooperation between design and utility coordination segments within DOTs also hamper utility coordination efforts (Sturgill, et. al., 2017). This presence of these challenges further validates the need to understand and mitigate utility risks associated with highway projects.

Furthermore, an emerging trend among state DOTs is the adoption of consultant-led utility coordination. How these arrangements are structured varies — the consultant performing the utility coordination may be the project design consultant or a standalone consultant retained strictly for utility coordination. This trend has gained momentum due to lack of resources at DOTs and; there has also been greater satisfaction with standalone utility coordination consultants (Sturgill, et. al., 2017). The method presented herein is not germane only for state DOTs, it can be used to inform consultants of the utility risks a project poses and potential strategies to best mitigate those risks. The nuances of consultant-led utility coordination are addressed within the research.

The research presented in this chapter contributes to and expands upon existing literature by outlining a statistically robust methodology to quantify and manage critical elements of the risks which affect the utility process during the early stages of project development and delivery.

The methodologies and tools are presented in a format that enables project managers and designers to quantify, document, and make informed decisions about uncertainties and risks in the management of utility issues. Of the several dimensions of utility-related risk, the research focuses on those that are the most critical because of their impact on project delivery costs and schedules. Prior experience suggests that risks stemming from uncertainties in utility facility locations, coordination and relocation schedules, and utility relocation cost estimates are also particularly critical and warrant attention. However, the approach presented here relies on readily available project information that can easily be gathered in early project stages to assist in prioritizing a project's utility coordination needs and thereby minimizing the previously mentioned risks that are not directly addressed. The risk algorithm presents a quantitative measure of risk that can then be used for prioritizing utility coordination and risk management efforts or for determining the feasibility and appropriateness of using consultant-led utility coordination on a project.

2.3. Approaches of Other State Transportation Agencies

The risk assessment tool presented in this chapter is conceptually similar to an approach that has been adopted by the Georgia Department of Transportation (GDOT). However, it improves that framework by boosting the level of automation in decision support functions and facilitating a quantitative evaluation of utility risk based on project characteristics (e.g., project type, number of utilities, utility type). Figures 2.1 and 2.2 illustrate Georgia DOT's tool (GDOT, 2017).

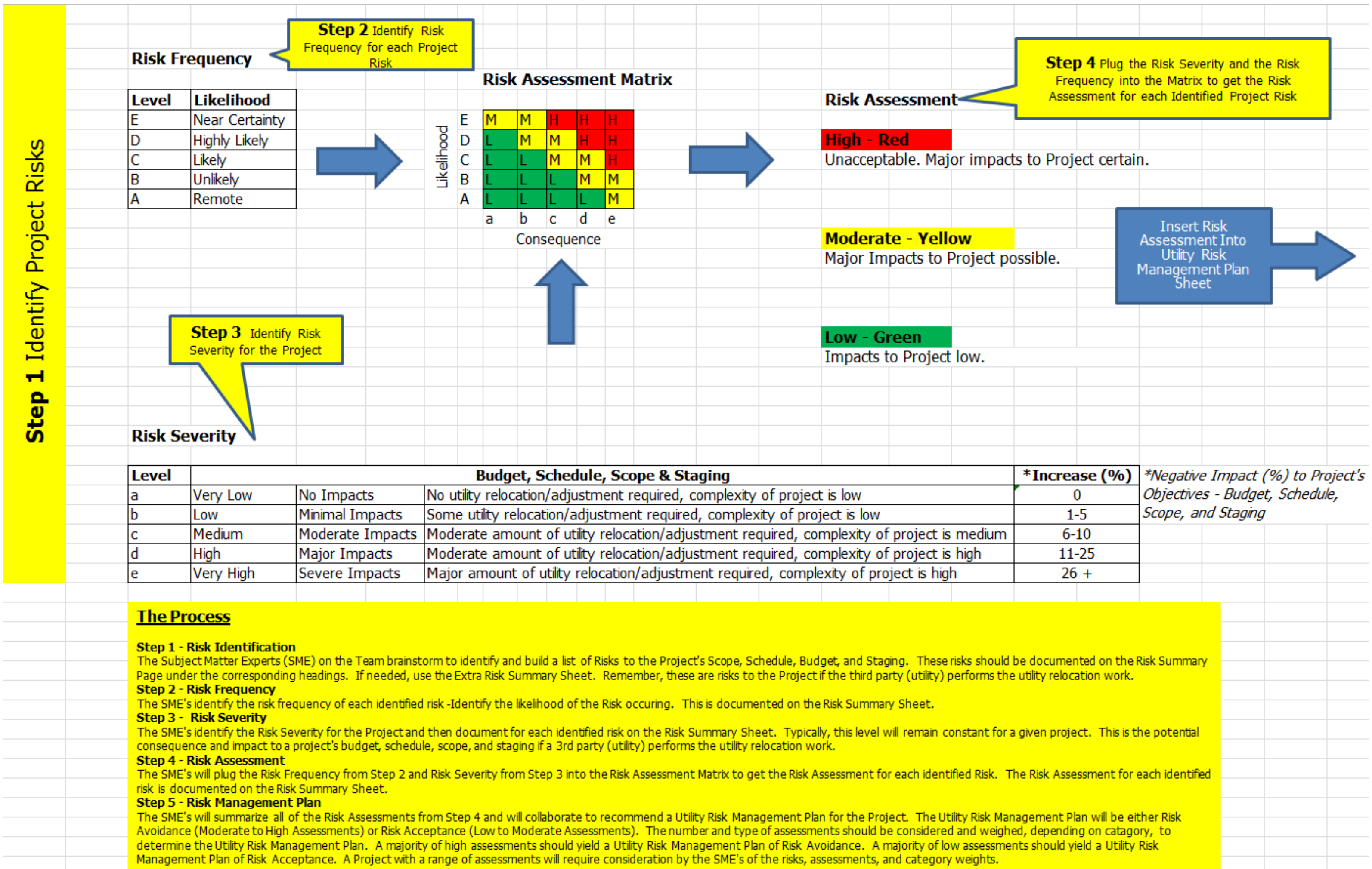


Figure 2.1: GDOT Project Risk Identification Process (GDOT, 2017)

*Project Information STPNH-0003-01(033), FULTON, PI 720570	Risk Analysis and Assessment			
(*Proj No, County, PI No.)	2. Risk Frequency	3. Risk Severity	4. Risk Assessment	
1. Risk Identification	Remote - Near Certainty	Very Low - Very High	High, Moderate, or Low	**Team Comments to Support Assessment**
Project Scope - <u>10%</u> (Consider Specific Risks to the Project's Scope if the 3rd Party Performs the Utility Relocation Work)				
Delay in Project Feature Implementation (i.e. Typical Section, Drainage, Structures)	HIGHLY LIKELY (D)	VERY HIGH (e)	HIGH	AMOUNT & PROXIMITY OF UTILITIES
Delay in Change Order Implementation	HIGHLY LIKELY (D)	VERY HIGH (e)	HIGH	
Project Location (Urban or Rural)	HIGHLY LIKELY (D)	VERY HIGH (e)	HIGH	URBAN
Utility Scope of Work (incl number and type of utilities)	HIGHLY LIKELY (D)	VERY HIGH (e)	HIGH	8 UTILITIES INCL CSX RR
Other Risks:				
Project Schedule - <u>20%</u> (Consider Specific Risks to the Project's Schedule if the 3rd Party Performs the Utility Relocation Work)				
Delays to Construction Schedule (Overall and Intermediate Completion Dates)	NEAR CERTAINTY (E)	VERY HIGH (e)	HIGH	PROJECT & UTILITY SCOPE, RR BRIDGE, STAGING
Delay Claim by Contractor	HIGHLY LIKELY (D)	VERY HIGH (e)	HIGH	
Delay in 3rd Party Material/Equipment/Labor	LIKELY (C)	VERY HIGH (e)	HIGH	
3rd Party Responsibility during Force Majeure Events	LIKELY (C)	VERY HIGH (e)	HIGH	LIKELY DUE TO PROJECT DURATION
Different, or Change in, Site Conditions	LIKELY (C)	VERY HIGH (e)	HIGH	
Past History of 3rd Party (Delays to Past GDOT Projects?)	NEAR CERTAINTY (E)	VERY HIGH (e)	HIGH	COMPARED TO SIMILAR PROJECTS IN DISTRICT 7
Other Risks:				
Project Budget - <u>20%</u> (Consider Specific Risks to the Project's Budget if the 3rd Party Performs the Utility Relocation Work)				
Damage or Delay Costs to GDOT or Contractor	HIGHLY LIKELY (D)	VERY HIGH (e)	HIGH	
Delay Claim by Contractor	LIKELY (C)	VERY HIGH (e)	HIGH	
Delay in 3rd Party Material/Equipment/Labor and Force Majeure	LIKELY (C)	VERY HIGH (e)	HIGH	
Different, or Change in, Site Conditions	LIKELY (C)	VERY HIGH (e)	HIGH	
Past History of 3rd Party (Overruns to Past GDOT Projects?)	HIGHLY LIKELY (D)	VERY HIGH (e)	HIGH	
Other Risks:				
Project Staging - <u>50%</u> (Consider Specific Risks to the Project's Staging if the 3rd Party Performs the Utility Relocation Work - Consider Scope/Complexity of the Project)				
Delay to Staging Implementation	NEAR CERTAINTY (E)	VERY HIGH (e)	HIGH	PROJECT HAS SEVEN STAGES
3rd Party Delays due to Force Majeure and Material/Equipment/Labor Availability	HIGHLY LIKELY (D)	VERY HIGH (e)	HIGH	
Other Risks:				
5. UTILITY RISK MANAGEMENT PLAN: RISK AVOIDANCE OR RISK ACCEPTANCE			RISK AVOIDANCE	HIGH RISK ASSESSMENTS FOR ALL IDENTIFIED RISKS, INCLUDING HIGH RISKS IN THE CATEGORY OF STAGING.

Figure 2.2: GDOT Project Risk Assessment (GDOT, 2017)

The Pennsylvania Department of Transportation (PennDOT) has developed a more detailed utility risk assessment tool — the Utility Impact Assessment. Although it is quantitative in nature and provides a means of aligning the evaluation with the subsurface utility engineering (SUE) quality levels, completing the assessment requires more detailed data. Some of these data may be unknown during early project states (e.g. utility depth, utility flexibility). A segment of the impact assessment is seen in Figure 2.3; the risk alignment chart is shown in Figure 2.4 (Sinha, et. al. 2007).

No.	Complexity Factors	Column 1		Column 2		Column 3	
1	Density of Utilities (number)	☐	1	☐	2 or 3	☐	> 3
2	Type of Utilities	☐	Less Critical	☐	Sub Critical	☐	Critical
3	Pattern of Utilities (number)	☐	1 Parallel or Crossing	☐	2 Parallel or Crossing	☐	> 2 Parallel or Crossing
4	Material of Utilities	☐	Rigid	☐	Flexible	☐	Brittle
5	Access to Utilities	☐	Easy	☐	Medium	☐	Restricted
6	Age of Utilities (years)	☐	≤ 10 years	☐	> 10 years, ≤ 25 years	☐	> 25 years
7	Estimated Utility Relocation Costs (% of total project cost)	☐	≤ 2%	☐	> 2, ≤ 5%	☐	> 5%
8	Estimated Project Traffic Volume (ADT per lane)	☐	≤ 1,500	☐	> 1,500, ≤ 6,000	☐	> 6,000
9	Project Time Sensitivity	☐	Low	☐	Medium	☐	High
10	Project Area Description	☐	Rural	☐	Suburban	☐	Urban
11	Type of Project/Section/Location	☐	Simple	☐	Moderate	☐	Complicated
12	Quality of Utility Record	☐	Good	☐	Fair	☐	Poor
13	Excavation Depth within Highway Right-of-Way, including Easement (inches)	☐	≤ 18”	☐	> 18”, < 24”	☐	≥ 24”
14	Estimated Business Impact	☐	Low	☐	Moderate	☐	High

Figure 2.3: PennDOT Utility Impact Assessment (Sinha, et. al. 2007)

Utility Related Risk Level	5	4	3	2	1	SUE Benefits Level (Positive)
80-100	SUE Quality Level C&D					0-20
60-80	SUE Quality Level B/C	SUE Quality Level C&D				20-40
40-60	SUE Quality Level B	SUE Quality Level B/C	SUE Quality Level C&D			40-60
20-40	SUE Quality Level A/B	SUE Quality Level B	SUE Quality Level B/C	SUE Quality Level C&D		60-80
0-20	SUE Quality Level A	SUE Quality Level A/B	SUE Quality Level B	SUE Quality Level B/C	SUE Quality Level C&D	80-100
Utility Complexity Level	5	4	3	2	1	Utility Complexity Level
Utility Related Risk Level						**SUE Benefits Level (Negative)**
0-20		SUE Quality Level A	SUE Quality Level A/B	SUE Quality Level B	SUE Quality Level B/C	0-20
0-20			SUE Quality Level A	SUE Quality Level A/B	SUE Quality Level B	20-40
0-20				SUE Quality Level A	SUE Quality Level A/B	40-60
0-20					SUE Quality Level A	60-80
0-20						80-100

Figure 2.4: PennDOT Utility Impact and SUE Quality Level Matrix (Sinha, et. al. 2007)

Other DOTs (e.g., Nevada and New Jersey) also have devised utility risk tools, however, they generally place greater emphasis on qualitative analysis and are more project- or risk-specific, which is a product of them being designed for use during the later stages of project development (NVDOT, 2012, and NJDOT, 2017). The purpose of this work is not to critique problems with the utility risk tools used by DOTs, rather it is to develop a risk tool that can be used earlier in the project development process. The data used to develop this risk assessment tool are more generic to utility coordination but are available in early project stages. Assessing risks with early-stage data may engender some inaccuracies, but it allows for early risk detection and mitigation.

2.4. Analysis and Guidance Development

The dataset analyzed was collected from the Kentucky Transportation Cabinet's (KYTC) Preconstruction Database. In contains information related to 13,856 highway projects, including:

- District;
- Project number;
- Type of work;
- Length;
- Number of lanes;
- Route type and number;
- Beginning and ending mile points;
- Phase funding amount and authorization dates;
- Construction cost estimates;

- Number of ROW parcels affected;
- Utility clearance date;
- Number and date of utility negotiations initiated and completed; and
- Number and date of utility agreements and relocations initiated and completed (Sturgill, et. al., 2014).

Several attempts were made to analyze the data using single comparisons (e.g., only looking at projects with utility clearance dates), however this limited the sample sizes used in the analysis. The method for modeling risk that was chosen relied on the comparison of three variables: 1) time required for utility activities; 2) number of utilities impacted by a project; and 3) the dollar value assigned to utility activities. Filtering the dataset to remove projects that lacked information on these variables returned 1,966 records. First, risk assignments were made by normalizing comparisons of different projects. Projects were assigned to one of three risk categories — low, medium, or high. Low-risk projects are those which involve utility relocations that do not require extensive effort and have a short duration. Medium-risk projects have a modest cost, do not involve longer durations, but should nonetheless be managed with careful oversight. High-risk projects exhibit extremely high costs and durations compared to other projects in the dataset. They require strong mitigation efforts to smooth out the process. After initially specifying the defining attributes of each risk level, the three variables used in the analysis were reviewed to further refine the level of risk assigned to each project. This resulted in three risk metrics — 1) Relocation Duration, 2) Utility Involvement, and 3) Utility Phase Estimate (Sturgill, et. al., 2014).

Relocation Duration risk scores were assigned to each project based on the amount of time spent on utility-related activities. Assignment of scores was based on the presumption that greater risk is present on projects with longer durations attributable to utility relocations and clearance. Not all of the data fields containing time-related information on utility relocations were fully populated (e.g., not every project had a utility phase authorization date, which denotes the beginning of utility work, or a utility clearance date, which indicates when relocation was completed). To overcome this issue, multiple comparisons were made to estimate the duration of utility relocation. Durations were estimated using the following parameters, with the list below offering a priority ranking:

- Utility Clearance Date versus Phase Authorization Date
- Utility Relocations Completed Date versus Phase Authorization Date
- Utility Agreements Completed Date versus Phase Authorization Date
- Utility Negotiations Completed Date versus Phase Authorization Date

Using these comparisons 743 records were assigned risk levels. Risk levels are defined in Table 2.1.

Table 2.1: Risk Assignment per Relocation Duration

Risk Category	**Description for Utility Duration**
Low (1)	Less than 365 days (1 year)
Medium (2)	Between 365 and 1095 days (3 years)
High (3)	Greater than 1095 days

Next, Utility Involvement risk scores were derived based on the number of utilities implicated in a project. The underlying presumption guiding score assignment was that having to coordinate a larger number of utilities increases the amount of project time devoted to utility relocation. Scores were assigned based on the maximum values recorded for either the number of utilities negotiated, utilities relocated, or utilities with agreements. Although this measure is more abstract than the Relocation Duration risk metric, it was valid and was used to analyze 1,503 project records. Table 2.2 illustrates the rules used to assign risk scores for utility involvement.

Table 2.2: Risk Assignment per Number of Utilities Involved

Risk Category	**Number of Utilities Involved**
Low (1)	Less than 3
Medium (2)	Between 3 and 6
High (3)	Greater than 6

The Utility Phase Estimate risk score is based on the funding authorized for a project's utility phase. The underlying presumption was that higher utility phase costs translate into more complicated and prolonged utility coordination or relocation. This metric was calculated for 1,878 project records. Risk scores were assigned based on descriptive statistics (Table 2.3). Utility phase values are highly skewed, indicating a large spread. Therefore, all projects with a utility phase value less than $300,000 (twice the median value) received a risk score of Low (1). Using twice the median value as a dividing line split the data into three groups; Table 2.4 summarizes how risk scores are assigned for the Utility Phase Estimate.

Table 2.3: Utility Phase Fund Statistics

Descriptive Statistic	Utility Phase Value
Average	$541,305
Standard Deviation	$962,140
Minimum	$0
Maximum	$9,717,856
First Quartile	$50,000
Median	$150,000
Third Quartile	$586,500

Table 2.4: Risk Assignment per Utility Phase Estimate

Risk Category	Utility Phase Authorized Amount
Low (1)	Less than $300,000
Medium (2)	Between $300,000 and $600,000
High (3)	Greater than $600,000

Once risk scores were calculated for the Relocation Duration, Utility Involvement, and Utility Phase Estimate metrics, a simple algorithmic average was computed to determine a project's composite — or final — risk score. A review of these scores indicated they were in alignment across multiple projects, validating the approach. After using the risk score to generate comparisons, multiple linear regression analysis was used to develop a model for risk assignment. Table 2.5 lists the number of projects from the analyzed dataset the fell into each risk category.

Table 2.5: Project Breakdown by Risk Assignment

Risk Category	**Number of Projects Per Risk Level (1,966 Total)**
Low (1)	836 (42.5%)
Medium (2)	745 (37.9%)
High (3)	385 (19.6%)

Exploratory data analysis was performed to ensure the data met the assumptions of multiple linear regression. Although the data contained a number of outliers, no transformations were necessary to meet the assumption of normality. The first model developed included six variables, three of which were categorical (n = 27 categories). The resultant regression equation had an R-squared value of 0.915, indicating that it explained approximately 92% of the variance.

Despite predictive value of this model, it was exceedingly complex to use because of the large number of variables. Using a backward selection stepwise procedure to achieve a parsimonious equation, a final model was developed that included district, project type, utility phase amount, and the number of utilities involved as the independent variables. The regression equation had an R-squared value of 0.84 and is:

Equation 2-1: Preliminary Utility Risk Equation

$$Risk = 1.14 - 0.02 * District - 0.00 * Type\ Bridge\ Replacement\ (1\ or\ 0) + 0.45$$
$$* Type\ Design\ Engineering(1\ or\ 0) - 0.09 * \ Type\ I$$
$$- Change\ Reconst(1\ or\ 0) + 0.13 * Type\ Major\ Widening\ (1\ or\ 0)$$
$$+ 0.68 * Type\ Minor\ Widening\ (1\ or\ 0) - 0.11$$
$$* Type\ New\ Interchange(1\ or\ 0) + 0.58$$
$$* Type\ Reconstruction\ (1\ or\ 0) + 0.07 * Type\ Safety(1\ or\ 0)$$
$$+ 0.36\ Type\ Safety - Hazard\ Elim(1\ or\ 0) + 0.00$$
$$* Type\ Spot\ Improvements(1\ or\ 0) + 0.02$$
$$* Phase\ Autorization\ (in\ \$100{,}000) + 0.13$$
$$* Number\ of\ Utilities\ Involved$$

Stakeholders can use this equation to estimate the level of utility-related risks a project is apt to experience during the early stages of project development. Knowledge of risk levels gives stakeholders a chance to identify tools and best practices for mitigating these risks. Projects may also be prioritized based on their risk level; data on risk can also be used when deciding on whether consultant-led utility coordination is appropriate. A word of caution — the regression model is not deterministic. Stakeholders should leverage the information it provides to provisionally estimate risks and strategize about the most appropriate ways to mitigate those risks. Because risk estimates are never entirely objective, professional judgment should always be used in conjunction with these methods.

2.5. Conclusions

Utility-related risks include many factors that affect a transportation agency's ability to deliver projects on time and within budget. Often information about utilities available during the early stage of project development is limited and uncertainties abound over its quality. Management of utility-related risks is accomplished through utility coordination, but is subject to restrictive legislative requirements. Effective utility coordination and risk management is only possible if project managers have access to risk assessments early on in project development. This can improve the delivery of transportation and other capital facility projects and reduce project risks posed by delays, safety hazards, and cost overruns. Utility coordination and relocation activities demand significant effort and interact with other project activities. To most efficiently use utility coordination resources, an estimate of a project's utility-related risks can assist with prioritization.

The tool presented in this chapter can facilitate DOTs' attempts to undertake an early assessment of utility coordination and relocation risks on transportation projects. It can also help align best practices with risk levels so that stakeholders can decide on mitigation measures and prioritize projects based on project characteristics. The approach presented to KYTC included an automated tool (Figure 2.5).

Utility Risk Assignment Worksheet

1. Please select the project type from the drop-down menu to the right:	Interchange Reconstruction
2. Please input the Utility Phase Authorization/Estimated Amount ($):	35000
3. Please input the number of utilities involved encountered/expected on the project:	2

Project Determined Risk Level 1.3

Project Specfic Considerations:

Tool	Strengths	Weaknesses	Opportunities	Threats
Early Utility Involvement in Design	• Early Incorporate utility knowledge in design process • Early identification of potential utility issues • Better coordinated	• Level of effort increases for utility staff early in project	• Time savings from better coordination • Money savings form avoiding potential issues	• More involvement could slow early design
Training project managers and other design personnel on utility issues	• Sufficient knowledge with regards to utility relocation. • Better and early identification of potential utility issue	• Level of effort increases for manager and design personnel	• Time and cost saving from better design • Time and cost saving from better management • Better coordination from more knowledge	• Spending more cost and time for training
Training consultant and utility owner personnel	• Sufficient knowledge with regards to utility relocation	• Level of effort increases for consultant and utility owner personnel	• Less reworks • More coordinated	• Spending more cost and time for training

Figure 2.5: KYTC Utility Risk Early Assessment Tool (Sturgill, et. al., 2014)

Determining the level of risk associated with utilities on a project is integral for shaping utility coordination efforts. Understanding risks and applying appropriate tools and best practices can also encourage the use of more efficient design and construction practices. Taking advantage of the approach described in this chapter, DOTs will be able to improve the allocation of utility coordination resources and generate insights about which projects are best suited to consultant-led coordination and other resource-driven strategies.

The methodology and prototype tool discussed in this chapter can be used to quantify and manage critical elements of risk affecting the utility process early in project development and delivery. They have been presented in a format that enables project managers and designers to quantify, document, and make informed decisions about the uncertainties and risks in the management of utility issues. The tool does not support a comprehensive assessment of utility-related risk; it focuses on those risks viewed as most critical because of their impacts on project delivery costs and schedules. The approach presented here relies on readily available project information that can easily be gathered during the early stages of a project. Risks attributable to uncertainties in utility facility locations, coordination and relocation schedules, and utility relocation cost estimates are also particularly critical and call for future research. Currently there is limited knowledge about the detailed analysis, assessment, and mitigation of utility related project risks across different project stages. This analysis and standardization of a risk assessment and management approach also warrants future investigation. By demonstrating project utility risk can be quantified and formalized using decision support tools, this research establishes a foundation for future efforts focused on deepening and enhancing these tools with richer data so that risk can be assessed and mitigated during multiple project phases and not only at the high-level supported by the methodology and tool described here.

2.6. Acknowledgements

The current work was supported by funding from the Kentucky Transportation Cabinet through the Kentucky Transportation Center. The views and opinions expressed by the authors are their own and do not represent the views of the supporting parties.

CHAPTER THREE: EFFECTIVE UTILITY COORDINATION THROUGH ALIGNMENT OF BEST PRACTICES

3.1. Introduction

According to the Federal Highway Administration's (FHWA) *Highway/Utility Guide*, "Effective [utility] coordination during construction begins with better coordination prior to construction" (Thorne et. al., 1993). This document, which presents fundamental practices for utility coordination, underscores that early involvement, communication, and planning are essential. Effective coordination is challenging, however, because utility and transportation facilities often share real estate (utilities within transportation right of way [ROW]) in order to provide services to the public by the most economical means (Thorne, et. al., 1993; Anspach, J., 2010). To realize those benefits without impairing utility or transportation projects, effective utility coordination is essential. This study synthesizes best practices for effective utility coordination so they can be aligned with project needs based on the feedback of subject matter experts.

Because terminology and processes related to utility coordination are not standardized across and within state departments of transportation (DOTs), the term *utility coordination* is fraught with ambiguity. Defining what constitutes effective utility coordination can be even more challenging. Within a single DOT, utility coordination processes may be handled differently by individual business units. These variances are permissible under federal regulations (23 CFR 645 and specifically, Subpart B, Subsection 645.211). For example, as described in the *Program Guide: Utility Relocation and Accommodation on Federal-Aid Highway Projects*, the definition of *utility* as it relates to reimbursement for relocation is broad in scope. Individual state laws are used to determine if a facility is to be treated as a utility (2003). Because since state laws vary, the definition of *utility* varies throughout the country. For example, some states regard cable television providers as utilities, whereas others do not. However, one key definition presented here because of the central role it plays in this chapter is *utility coordination*. Here, utility coordination is defined as the active effort to communicate, share information, and interact productively with all applicable stakeholders regarding utility involvement, adjustment, and relocation during all delivery phases (planning, design, construction, operation, and maintenance) of a transportation project (Thorne, et. al., 1993). Utility coordination encompasses agreements, estimates, risk identification and management, reimbursements, and all other terms associated with these interactions. Commonly accepted focal areas of utility coordination include:

- Providing communication, identification, and engineering expertise throughout the course of utility and transportation project interaction;
- Minimizing utility and transportation project impacts;
- Determining relocations and initiating them as early as possible; and
- Reimbursing relocations and disturbances, as applicable, according to complex and nonstandard (varying from state-to-state) regulations.

Effective utility coordination improves the delivery of transportation and other capital facility projects. It also reduces project risks posed by delays, safety hazards, and cost overruns. Effective utility coordination minimalizes impacts to the transportation project and utility facilities. Numerous practices are available to assist with effective utility coordination, but there is no consensus on how to appropriately use them.

3.2. Project Scope, Goals, and Objectives

This chapter catalogues a range of utility coordination practices in an effort to build and establish a consensus on their appropriate use. Information was gathered through a literature review, survey, and case-based interviews on the following issues salient to utility coordination:

- Core elements of effective utility coordination;
- Current practices for performing utility coordination in-house;
- Document how and when stakeholders are integrated into utility coordination processes (e.g., design team, contractors, utility owners, consultants, resource agencies) and their perspectives on the use of particular utility coordination practices;
- Processes by which an effective utility coordination project is scoped (e.g. project schedule, type and complexity of project, level of effort, level of risk, practice usage).

This chapter documents the practices currently used for utility coordination; describes previous research that has been incorporated into utility coordination practice; discusses how DOTs and utility stakeholders scope, conduct, and manage utility coordination; and reviews what coordination practices are considered effective. Additionally, it investigates the interactions and feedbacks among utility stakeholders outside of the DOT including consultants, utility owners, researchers, and contractors through a survey of non-DOT stakeholders. Best practices are synthesized from a nationwide sample of DOT and non-DOT subject-matter experts as well as a Kentucky-focused survey of similar stakeholder groups. Based on this information, the chapter reviews a number of utility coordination practices and discusses the alignment of these practices to project risks.

3.3. Research Methodology

The review of published literature and relevant legislation focused on topics related to utility coordination, location practices, and the Strategic Highway Research Program (SHRP2) utility-related products. Select trainings, educational modules, and academic literature as well as published procedures and policies related to effective utility coordination at state DOTs were also reviewed. Comparative legislative analysis examined differences in state-level utility-related statutes.

Nationwide surveys were used to document the current state of the practice in utility coordination, determine how research on utility coordination has been implemented, and identify practices viewed as effective in utility coordination. When the survey was sent to the AASHTO Subcommittee on Right-of-Way, Utilities, and Outdoor Advertising Control it garnered a response rate of 84% (42 states out of the 50 surveyed). A separate survey was developed and distributed to non-DOT utility stakeholders, including the National Utility Locating Contractors Association (NULCA), the American Society of Civil Engineers Utility Engineering and Surveying Institute (ASCE-UESI), members of the Transportation Research Board Standing Committee on Utilities, and research panel contacts, among others. Appendices contain the full version of each survey. Broadly, the survey of DOT stakeholders sought information on the following topics:

- Procedures and effectiveness of utility coordination processes,
- Organizational structure relative to utility coordination processes,
- Elements of effective utility coordination,
- Timeliness of utility coordination,
- Incorporation of SHRP2 utility products,
- Use and evaluation of consultant-led utility coordination,
- Inconsistencies in guidance and legislation, and
- Research and knowledge gaps.

Although similar in scope to the surveys administered to DOT stakeholders, the surveys distributed to non-DOT stakeholders eliminated questions applicable only to DOTs (e.g., questions about agency structure). This survey sought information on stakeholders' experiences with effective utility coordination so they could be compared to DOT feedback.

To supplement the findings of the literature and legislative reviews and surveys, six DOT stakeholders with subject-matter expertise in utility coordination were interviewed. Interviewees were selected not only to achieve a representative geographical sampling but to question those who are knowledgeable of various implementation stages of recent utility coordination research and practices. Interviews were conducted to deepen and enrich information previously gathered and to determine situations in which to apply different best practices. Other state DOTs wanting to strengthen their utility coordination procedures can draw useful information from these case studies. DOT representatives from Kentucky, Maryland, Utah, Virginia, Washington, and Wyoming were interviewed. As part of the study focused on Kentucky, utility company representatives were interviewed to learn their perspectives on the use of various utility coordination practices. Kentucky Transportation Cabinet utility coordination experts and their utility company counterparts were asked also to review the applicability of certain utility coordination practice risk ranges — with risk defined on a scale of low, medium, and high — relative to potential cost and schedule impacts to a highway project. Based on the information gathered, a list of utility coordination best practices aligned with potential utility-related risks on highway projects was prepared.

3.4. Literature and Legislation Review

Several older reports on utility coordination and relocation practices, despite their age, remain valuable sources of information. The 1993 FHWA *Highway/Utility Guide* thoroughly review the history of utility accommodation along highways and was, for many years, the definitive informational source for utilities and highways sharing common ROW (Thorne et al. 1993). It highlights concepts of early involvement, location practices, and accommodation practices. The American Association of State Highway Transportation Official's (AASHTO) *A Guide for Accommodating Utilities Within Highway Right-of-Way* also contains useful background information (2005). This resource along with AASHTO's *A Policy on the Accommodation of Utilities within Freeway Right-of-Way* (2005), informed the development of the survey and interview questions. They also assisted in standardizing the definition of terms. These resources collectively present the importance of utility accommodation in highway ROW and emphasize the need for sound utility coordination practices.

Sturgill et. al.'s list of utility coordination practices were used to develop survey questions regarding the practices implemented at state DOTs as well as stakeholder perceptions of their effectiveness (2014). The AASHTO Standing Committee on Highways' *Strategic Plan Strategy 4-4* (2004) facilitated question development as did the Strategic Highway Research Program 2 (SHRP2) Report S2-R15-RW (2009). A review of these sources enabled the development of a comprehensive list of utility coordination best practices. They also provided insights into where on the project timeline DOTs situate utility coordination practices. Table 3.1 itemizes several of the utility coordination practices used by a subset of state DOTs.

Table 3.1: Summarized Use of Utility Coordination Processes

Process	**Sub-process**	AZ	CA	CO	FL	IN	MI	NY	PA	TX	VA	KY
Long-range plan and communication with Utility Owners				▲	▲		▲		▲	▲	▲	▲
Utility coordinating committee				▲	▲					▲	▲	▲
Utilize joint-use agreements			▲	▲						▲		
Training program for project design engineers on utility relocations			▲	▲					▲	▲	▲	
Statewide utility mapping system									▲	▲	▲	▲
Identify utilities in conflict (percent design stage)	30%, 60%, or 90% design stage	30		30	30	30	60	30	30	30	30	
Location information from utilities (percent design stage)	30%, 60%, or 90% design Stage	30		30	30	30	30	30	30	30	30	

Process	**Sub-process**	AZ	CA	CO	FL	IN	MI	NY	PA	TX	VA	KY
Utilities begin relocation design (percent design stage)	30%, 60%, or 90% design Stage	60	30	60	60	60	90	60	60	60	60	
Use of One Call system				▲	▲	▲		▲	▲			
Conduct field survey			▲			▲		▲	▲	▲	▲	▲
Use of SUE				▲	▲	▲		▲	▲	▲	▲	▲
Utility coordination meeting		▲	▲		▲	▲	▲		▲	▲	▲	▲
Provide Utility Owners contact list		▲				▲	▲		▲	▲	▲	▲
Outsource relocation design	Utility Owners can use design consultants	▲	▲	▲			▲		▲			▲
	DOT can act as Utility Owners' design Consultant		▲	▲			▲		▲			▲
Preconstruction meeting		▲	▲	▲	▲	▲	▲		▲	▲	▲	▲
Utility preconstruction meeting									▲			
Partnering meetings							▲		▲	▲	▲	
Relocation work performed before construction, when feasible			▲	▲		▲	▲	▲	▲			
Relocation work	Utility Owner performs Relocation	▲	▲	▲		▲	▲	▲	▲	▲	▲	
	Use of subcontractors	▲	▲	▲		▲	▲	▲	▲	▲	▲	
	Use of DOT's Contractors	▲	▲	▲		▲	▲	▲	▲	▲	▲	
Field conflict resolution process			▲									▲

Process	**Sub-process**	AZ	CA	CO	FL	IN	MI	NY	PA	TX	VA	KY
Post construction meeting												
Process for unexpected utility conflicts during construction			▲	▲								▲
As-built requirements	Provided by Utility Owners											
Design–build contracts												

Questions related to survey respondents' use of best practices were influenced by these widely accepted guidance documents. Respondents were also asked to comment on when their agency's utility coordination practices take place in relation to their design process. With respect to timing, previous research (see also Table 3.2), indicates that many DOTs regard 30% design plans (preliminary design) as the appropriate time for involvement of utility coordination. However, waiting until Preliminary Design to initiate utility coordination efforts could result in problems depending on the level of environmental agreements already completed for the project and ROW requirements. Recent work (such as Sturgill et. al., 2014) suggests much earlier utility involvement benefits the project development process.

Because SHRP2 research products on utility coordination are frequently utilized and discussed, they informed the development of survey and interview questions. State DOTs rely on these research products for state-of-the-art methods of location, data management, and utility conflict resolution. Much of the SHRP2 research attempts to standardize location technology and associated data, although R15B ties in nicely with utility coordination during the management of utility conflicts and risk. Several pilot programs are in place. As evidenced from the case study interviews, incorporating these practices into formalized utility coordination procedures can improve DOT utility coordination programs. Table 3.2 summarizes key SHRP 2 products.

Table 3.2: SHRP2 Products and Descriptions

Product	Description
3D Utility Location Data Repository (R01A)	Provides a 3D data storage and retrieval model that can influence utility coordination by making location information readily available. Stored data include the horizontal and vertical location of the utilities as well as attribute data needed to effectively coordinate with utility owners.
Utility Investigation Technologies (R01B)	Presents a collection of credible nondestructive geophysical location technologies. This information — when used within a SUE process — offers engineers the best collection of multisensor tools for detecting and locating utilities when there are varying geophysical characteristics. R01B focuses specifically on the use of two technologies: time-domain electro-magnetic induction and multi-channel ground penetrating radar. The survey queried respondents about their use and the effectiveness of advanced technologies.
Innovation in Location of Deep Utilities (R01C)	Early in this project, researchers decided to focus on shallower yet more difficult to locate utility facilities (e.g., stacked utilities). R01C became closely integrated with the R01B project but avoided duplication. The R01C project focused on location technologies such as long-range radio frequency identification tagging and active acoustic location by placing acoustic generators on the facility/pipe.
Identifying and Managing Utility Conflicts (R15B)	A project directly related to utility coordination and utility conflict management. The early phases of this product proposed the Utility Conflict Matrix as a tool to identify, track, and manage utility-related conflicts during project development. DOTs could use this tool to conduct more strategic and systematic utility coordination. The project's final report highlights many of the findings mentioned in by survey respondents and interviewees. For example, the report notes that because DOTs do not view utility

	relocation/coordination as integral to the design process, utility owners become involved after much of the design is already completed, potentially causing delays and rework that could be avoided by earlier involvement. Notable conclusions from this report include: Utilities owners have limited resources. Utility relocation/coordination is not the primary focus of transportation designers. Coordination of multiple utility owners is often problematic. DOTs operate on short time frames to deliver projects. Delayed coordination with utility owners often results in ROW issues if utility ROW needs are neglected One-Call locators information may not be as timely or as accurate as needed Utility owners and transportation construction contractors may incur schedule delays because they do not synchronize operations. The report advances the following recommendations: Operate as a team. View utilities in the highway ROW as the DOT's responsibility. Understand/learn the business processes of the counterpart (utility owner/DOT). Improve location and mapping methods (Ellis et. al., 2009).

The FHWA's website on utilities in project development presents training opportunities, online webinars, and resource materials related to highway utility coordination (http://www.fhwa.dot.gov/utilities/). With several ongoing research efforts related to utility location and coordination, future updates to this website will likely capture more sources of information.

Many utility coordination professionals have also expressed concern about the consistency of utility-related legislation, regulations, and guidance. Investigation into legislation, regulations, and guidance does indicate a level of variance regarding utility coordination. According to the *Program Guide: Utility Relocation and Accommodation on Federal-Aid Highway Projects*, state DOTs can adopt unique criteria in their accommodation, relocation, and reimbursement policies. A notable example is the definition of facilities considered as a utility. Some states view certain telecommunications as a utility while others do not (2003). This issue affects cellular towers, renewable energy facilities, and fiber optics. These considerations determine aspects of a facility's accommodation, relocation, and reimbursement policy. Additionally, the National Highway Institute training workbook for the course, *Utility Coordination for Highway Projects*, points out that DOTs have specific accommodation policies that are approved by the FHWA. These policies must be at least as stringent as federal guidelines, but alterations may be allowed with local FHWA approval. States also formulate individual relocation, reimbursement, and longitudinal access policies and legislation. Because each state has the ability to enact a totally unique set of policies, the concern over consistency within utility coordination is justified.

3.5. Collection of Best Practices and Findings

The goal of the surveys was to identify effective utility coordination best practices and the extent of their use. For the DOT survey, respondents were first asked what constituted effective utility coordination. Respondents were asked to rank effectiveness on *Timely Utility Involvement on the Project, Utility Coordination Communication, Utility Relocation/Alignment is considered within Design Decis*ions*, Minimized Utility Relocation Cost*, and *Timely Utility Relocations*. Figure 3.1 summarizes the responses, which indicated that communication, timely involvement, and utility consideration within design are areas DOTs view as most effective in utility coordination (Sturgill, et. al., 2017).

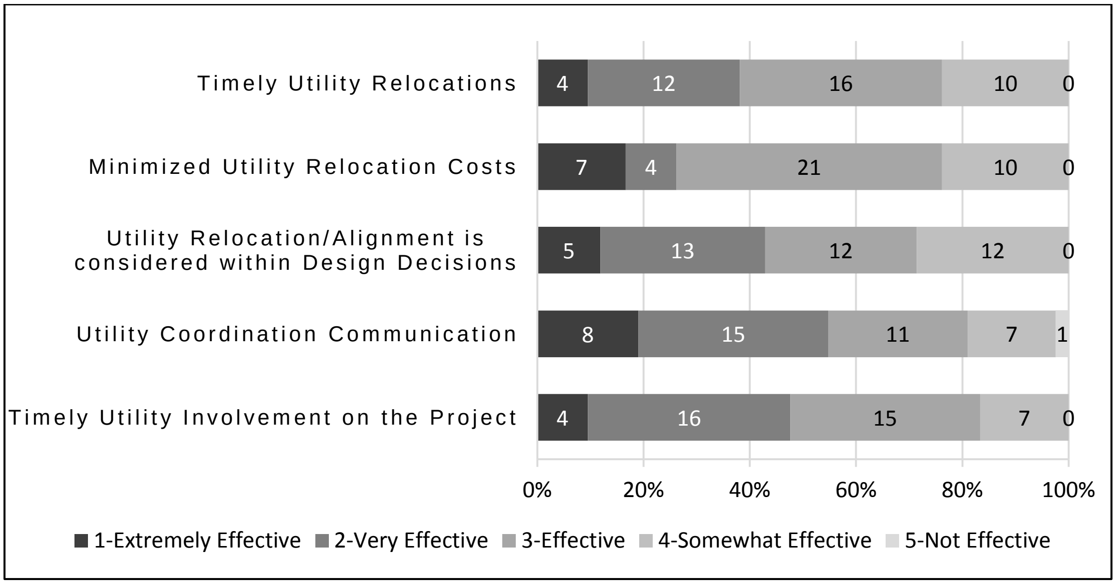


Figure 3.1: Effectiveness of Selected Utility Coordination Practices (Sturgill, et. al., 2017)

When asked if their DOT employed a measure to assess the effectiveness of utility coordination, 53% of respondents said no such measure was in place. While many DOTs may rely on anecdotal evidence to diagnose the effectiveness of utility coordination, most agencies are not systematically collecting data or using performance measures to track and improve utility coordination practices. Interviews revealed further details on how agencies tackle the question of measuring utility coordination effectiveness (Sturgill, et. al., 2017).

Even without firm empirical measures of utility coordination effectiveness, respondents described — based on personal experience — practices they considered effective (Figure 3.2). Respondents could only select eight practices from the list. As evident from the break following *Identify and Plan for Long-Lead Items*, there was broad consensus about the most effective practices (Sturgill, et. al., 2017).

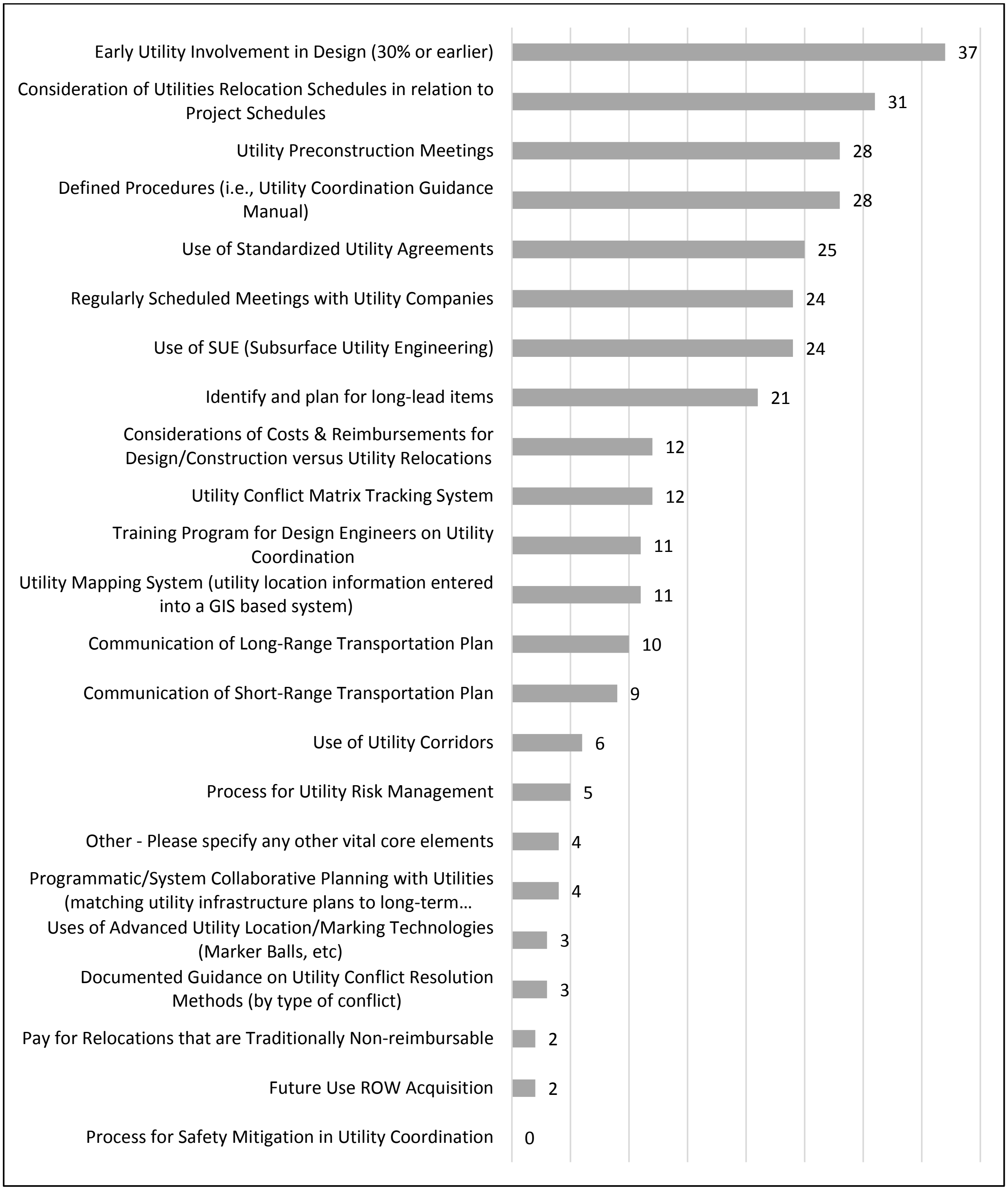


Figure 3.2: Top Effective Utility Coordination Practices Selected by DOTs

Respondents were also asked to select all the practices they presently use or could use within utility coordination (Figure 3.3). The responses indicate some DOTs have more options at their disposal than others and intimates what research and technologies have been implemented. Notably, utility conflict tracking (SHRP2 R15B Utility Conflict Matrix) was listed frequently. Responses captured in Figure 3.3 correlate with those of Figure 3.2 in that if an DOT does not use a particular practice respondents from that agency were unlikely to include it on their list of effective practices. For instance, advanced location technologies, such as marker balls, do not appear to have been readily adopted. Thus, it being cited so few times as an effective practice is likely a product of the technology's newness — not its ability to add value.

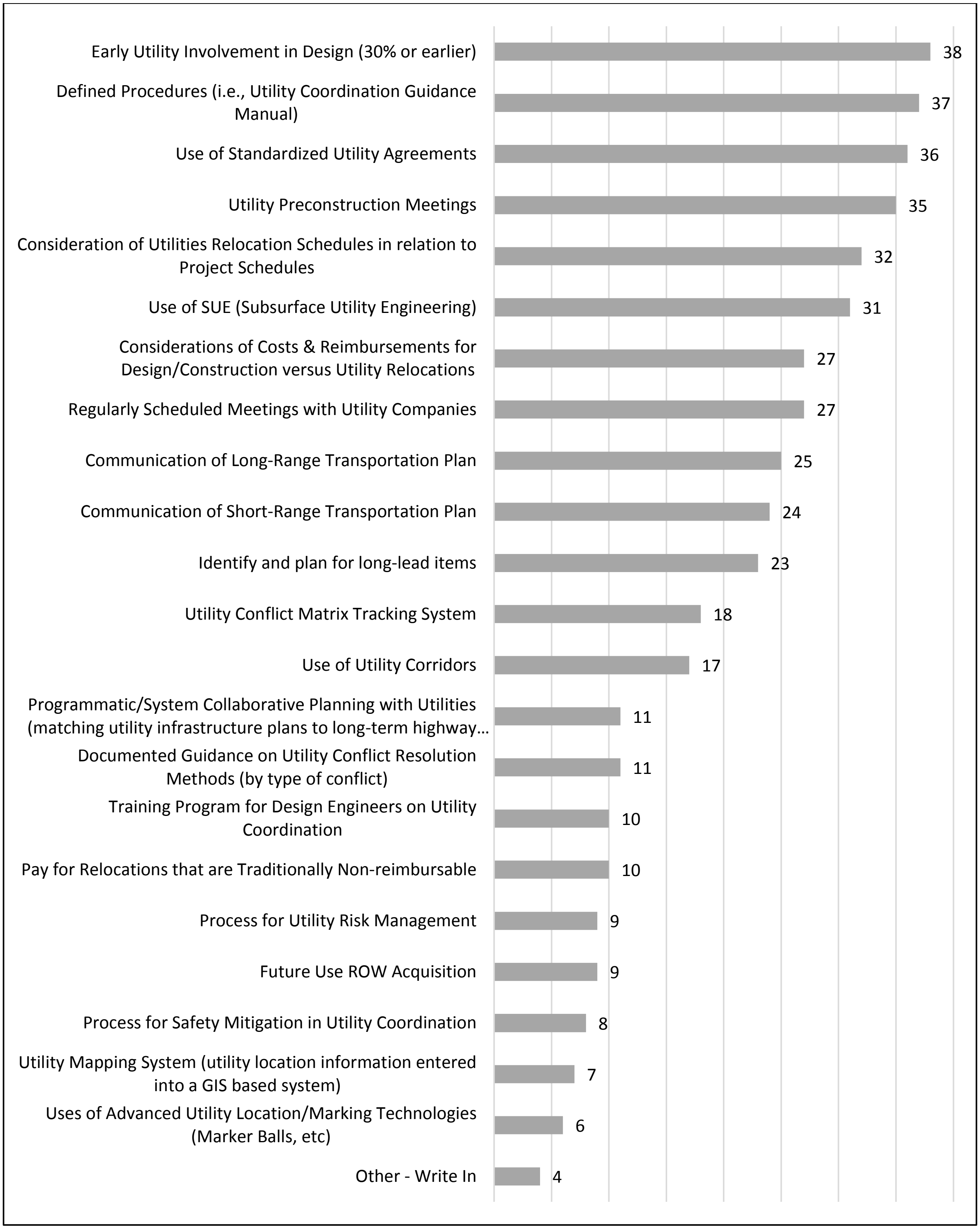


Figure 3.3: Utility Coordination Practices Used by DOTs (Sturgill, et. al., 2017)

Respondents from other stakeholder groups were also asked about effective utility coordination practices. Table 3.3 summarizes the information collected from DOT respondents, non-DOT respondents, and utility owners, which have been placed in a category separate from the non-DOT respondents. These results show that DOTs and utility companies do not always share the same perspective on what counts as an effective utility coordination best practice.

Table 3.3: Effective Utility Coordination Practices (Limited to Choosing Top 8) (Sturgill, et. al., 2017)

Element	% of DOT Respondents Selected (n=42)	# of Non-DOT Respondents Selected (n=29)	# of Utility Owners Selected (n=16)
Early Utility Involvement in Design (30% or earlier)	88% ★	26 ★	15 ★
Utility Preconstruction Meetings	67% ☆	20 ★	12 ★
Defined Procedures (i.e., Utility Coordination Guidance Manual)	67% ★	17 ★	8 ☆
Consideration of Utilities Relocation Schedules in relation to Project Schedules	74% ★	15 ☆	10 ★
Use of SUE (Subsurface Utility Engineering)	57% ☆	13 ☆	2
Regularly Scheduled Meetings with Utility Owners	57% ☆	12 ☆	5
Communication of Short-Range Transportation Plan	21%	12 ☆	9 ☆
Use of Utility Corridors	14%	12 ☆	8 ☆
Use of Standardized Utility Agreements	60% ☆	8	6
Identify and plan for long-lead items	50% ☆	4	0
Utility Mapping System (utility location information entered into a GIS based system)	26%	10	7 ☆
Communication of Long-Range Transportation Plan	24%	10	7 ☆

★ - Top 3 elements selected by respondents ☆ - Top 8 elements selected by respondents

3.6. Utility Coordination Practice Alignment to Highway Project Utility Risks

Based on the literature and survey findings, a list of utility coordination best practices was prepared along with potential benefits and drawbacks of their use. Table 3.4 summarizes the list of best practices. The entry for each practice denotes what level of risk it is appropriate for (see Chapter 2), strengths and weaknesses, opportunities, and threats. Practices are also aligned with specific project issues that they can potentially alleviate. Although this tool offers guidance for practitioners, no situation will match up perfectly with those described in the table. And in some circumstances a tool will fall outside the defined risk type. As such, professional judgment should always be used. Best practices were vetted with subject-matter experts at the Kentucky Transportation Cabinet to validate their substance.

Table 3.4: Utility Best Practice Toolkit Guidance (Sturgill, et. al., 2014)

Tool	Appropriate Risk Level	Strengths	Weaknesses	Opportunities	Threats
Early Utility Involvement in Design	1,2,3	Early incorporation of utility knowledge in design process Early identification of potential utility issues Better coordination	Level of effort increases for utility staff early in project	Time savings from better coordination Money savings form avoiding potential issues	More involvement could slow early design
Training project managers and other design personnel on utility issues	1,2,3	Sufficient knowledge with respect to utility relocation Better and early identification of potential utility issues	Level of effort increases for manager and design personnel	Time and cost savings from better design Time and cost savings from better management Better coordination from more knowledge	Higher time and financial commitments for training

Training consultant and utility owner personnel	1,2,3	Sufficient knowledge with respect to utility relocation	Level of effort increases for consultant and utility owner personnel	Less rework More coordination	Spending more cost and time for training
Early utility cost estimation based on worst-case scenario	2,3	Better budgeting	Time and effort in development	Early understanding of cost and potential scope	Accrue unneeded budget
Using technology tools such as Google Earth, GIS in the planning stage	2,3	More effective tools for planning	Lack of experts Personnel training	Time savings Cost savings More effective management	Higher time and financial commitments for training
Contracting with expert consultants versed in utility design	2,3	Better consultant Better design	Availability Higher cost	Less conflict and rework from better design	Higher costs from contracting with expert consultant
Developing a database of historical utility relocation costs to generate best cost estimate		Sufficient historical data with respect to utility relocation cost	Additional effort	Faster and more accurate utility relocation cost estimation	Spending more time and expense to accumulate historical data for the first time
Installing radio frequency identification markers on		Easy and cheap method to find nonmetallic utility	Technology is not that common High cost	Time and cost savings identifying nonmetallic	Need more time to install these markers Spending

nonmetallic utilities				utilities	additional money to provide and install these devices Security concerns
Developing a GIS system to store, manage, and retrieve utility information		Having a strong, sufficient, and modern database	Lack of professional personnel	Easy to update All sectors can update database with any changes in utility Easy access to database for all sections involved in utility relocation Better management Time and cost savings	Significant time commitment and expense involved in the of transfer old data to new system. Time and cost of training personnel.
Establishing utility corridors for utilities crossing major highways	3	Early identification of utility area	Requires greater consideration and possibly cost early design	Time saving Easier utility design and utility ROW issues	Increases ROW cost May not always meet utility needs
Ensure consistency across guidance documents	2,3	Better coordination Early identification of potential conflict	Requires considerable effort and coordination	Time savings from better coordination	Significant time investment to ensure all guidance documents do

		in different guidance			not conflict
Placing utility expert on project design team	2,3	Enhancing utility knowledge of design team	Additional time spent in early design	Time and cost savings from more professional design	More effort spent to satisfy utility constraint than perhaps needed
Developing standardized format to identify and resolve utility conflicts		Early identification of utility conflicts and their resolution Better management	Standardized format cannot cover all conflicts	Time and cost savings from quickly identifying and resolving utility conflicts	Issues from using standardized format may cease being a problem when the conflict is outside the standard scope
Having frequent joint meetings with utility owners as design progresses	2,3	Incorporate utility knowledge design process Identification of potential utility issues Better coordination	Level of effort increases for utility staff	Time savings from better coordination Money and time savings from avoiding potential issues	Greater involvement could slow design
Providing training in highway plan reading to	1,2,3	Sufficient utility owner knowledge in highway plan	Level of effort increases for utility staff	Time savings from better coordination	Higher time and financial commitments for training

utility owners		reading Better coordination			
Performing utility relocation work before highway construction begins	3	Construction can begin without utility conflicts	Possible delays in bid telling	Fewer conflicts between highway construction and utility relocation work	Delays from waiting to finish utility relocation work Potential cost escalations
Coordinator handles each project from start to finish	1,2,3	Better coordination Better management	Cannot control personnel loss	Time savings from better management and coordination. Cost savings from better management	Staffing turnover could leave gaps without replacement if others are not familiar with the project
Acquiring sufficient ROW for utility purposes	2,3	Sufficient ROW for utility purpose	Increased ROW Cost	Time savings for achieving ROW for utility purpose Time saving and less conflict in design	Purchase of unneeded ROW
Work site utility coordination supervisor	3	Better coordination	Greater effort required from work site utility coordination	More coordination Less conflict Less rework	Higher costs for hiring expert supervisor

coordinates utility work during the construction phase on every project that uses SUE.			supervisor Availability		
SUE consultant is needed to provide the corresponding recommendation	3	Better consultant Better design	Availability Higher cost	Less conflict and rework from better design	Higher cost due to contracting with expert consultant
DOTs permit reimbursement of a utility for the cost of relocating its facility early	3	Early involvement	Higher cost	Less negotiation Less conflict	Less quality Potential for more rework

Table 3.5 describes specific project issues and identifies which tools and practices could offer the greatest benefits. This tool was designed for the Kentucky Transportation Cabinet and vetted by their subject-matter experts.

Table 3.5: Project Utility Issues Aligned with Best Practices (Sturgill, et. al., 2014)

Project Issue	**Helpful Tools**	**Potential Benefits and Concerns**
Overhead Utility Relocations and Associated Delays	Early Involvement and Communication	Engineering and relocation begins as soon as possible, and parties are able to plan or apply other tools accordingly.
	Investigate Temporary Relocations	May simply push delays back; may incur additional costs.
	Establish a Utility Corridor	Could ease the engineering process if done appropriately; may not satisfy all needs.
	Separate or Service Contract for Clearing and Grubbing	Could speed the relocation process; could lead to erosion concerns.
	Utility Impact Notes	Allows the project to go to letting and work to begin; if the dates noted slip, could result in delay charges to the KYTC.
	Incentives for Non-Reimbursable Utilities	Could incentivize utilities to relocate; some companies will not view the incentive as prosperous; use with caution.
	KYTC design of Utility Facilities	This could speed engineering; may be difficult finding qualified designers and utility companies may not allow it.
Long-Lead or Specialty Items	Early Involvement and Communication	Engineering and relocation begins as soon as possible and parties are able to plan

		or apply other tools accordingly.
	Avoidance	Considering redesign costs is necessary to avoid potentially lengthy utility issues.
	KYTC Order/Purchase of Items	May speed utility company order/purchase process; may result in acquisition of unused items and reimbursement may be cumbersome.
Underground Utility Location and Relocation and Associated Delays	Early Involvement and Communication	Engineering and relocation begins as soon as possible and parties are able to plan or apply other tools accordingly.
	Investigate Temporary Relocations	May simply push delays back; may incur additional costs.
	Incentives for Non-Reimbursable Utilities	Could incentivize utilities to relocate; some companies will not view the incentive as sufficient; use with caution.
	Use of Joint Trenches	May speed alignment but coordination could raise concerns.
	Strategic use of SUE	Determine level needed based on guidance
	Use of Marker Balls or Other RFID Location Devices for Future Reference	Good for continued location; utility companies may not approve.
	Technology Locations (e.g., Ground Penetrating Radar)	Could be costly; best used as part of SUE determination.
Utility Company Easement Issues	KYTC Acquisition of Easements	Legal concerns.
Local/Small Utility Constraints for Relocation	Incorporate Utility Relocations in Contract	Could speed relocations if acceptable to utility owner, though inspection and quality control could be a concern.
Hazardous Material or High Risk Facilities	Early Involvement and Communication	Engineering and relocation begins as soon as possible,

		and parties are can plan or apply other tools accordingly.
	Avoidance	Consider redesign costs as needed to avoid potentially protracted utility issues.

3.7. Utility Coordination Risk Decision Support Tool

Building from previous research that advanced a method to estimate utility-related risk for preliminary highway projects in for Kentucky, the findings related to best utility coordination practices were assigned to one of three risk levels — low, medium, high (Table 3.4). To assist with the implementation of both the preliminary utility risk model and alignment of best practices, a decision support tool was created for the Kentucky Transportation Cabinet. The utility risk decision support tool uses an equation to identify multiple utility risks and the select mitigation strategies best suited for particular risks. The tool was developed using macros enabled within Microsoft Excel. With minimal user inputs, a project's estimated utility risk level is displayed along with corresponding utility coordination best practices. The output for the decision support tool is depicted in Figure 3.4.

Utility Risk Assignment Worksheet

1. Please select the project type from the drop-down menu to the right: Interchange Reconstruction

2. Please input the Utility Phase Authorization/Estimated Amount ($): 180000

3. Please input the number of utilities involved encountered/expected on the project: 5

Project Determined Risk Level 1.7

Additional Considerations:

Project Issue	Helpful Tools	Potential Benefits & Concerns
Overhead Utility Relocations & Associated Delays	Early Involvement & Communication	Engineering and relocation begins as soon as possible and parties are able to plan or apply other tools accordingly
	Investigate temporary relocations	May simply push delays back; may incur additional costs
	Establish a Utility Corridor	Could ease the engineering process if done appropriately; may not satisfy all needs
	Separate or Service Contract for Clearing & Grubbing	Could speed the relocation process; could entail erosions concerns
	Utility Impact Notes	Allows the project to go to letting and work to begin; if the dates noted slip, could result in delay charges to the KYTC
	Incentives for Non-Reimbursable Utilities	Could incentivize utilities to relocate; some companies will not view the incentive as prosperous; use with caution
	KYTC design of Utility Facilities	This could speed engineering; may be difficult finding qualified designers and utility companies may not allow it
Long-Lead or Specialty Items	Early Involvement & Communication	Engineering and relocation begins as soon as possible and parties are able to plan or apply other tools accordingly
	Avoidance	Consider redesign costs is needed to avoid potentially lengthy utility issues
	KYTC order/purchase of items	May speed utility company order/purchase process; may acquire unused items and reimbursement may be cumbersome

Project Specfic Considerations:

Tool	Strengths	Weaknesses	Opportunities	Threats
Early Utility Involvement in Design	• Early Incorporate utility knowledge in design process • Early identification of potential utility issues • Better coordinated	• Level of effort increases for utility staff early in project	• Time savings from better coordination • Money savings form avoiding potential issues	• More involvement could slow early design
Training project managers and other design personnel on utility issues	• Sufficient knowledge with regards to utility relocation. • Better and early identification of potential utility issue	• Level of effort increases for manager and design personnel	• Time and cost saving from better design • Time and cost saving from better management • Better coordination from more knowledge	• Spending more cost and time for training
Training consultant and utility owner personnel	• Sufficient knowledge with regards to utility relocation	• Level of effort increases for consultant and utility owner personnel	• Less reworks • More coordinated	• Spending more cost and time for training
Early utility cost estimation based on worst assumption	• Better budgeting	• Time & effort in development	• Early understanding of cost &potential scope	• Pricing unheeded budget
Using technology tools such as Google Earth, GIS in the planning stage	• More effective tools for planning	• Lack of enough experts • Personnel training	• Time saving • Cost saving • More effective management	• Spending more time and cost for training
Contracting with expert consultants versed in utility design	• Better consultant • Better design	• Availability • Higher cost	• Less conflict and rework from better design	• More cost from contracting with expert consultant
Ensuring that all guidance document do not conflict with each other	• Better coordination. • Early identification of potential conflict in different guidance	•	• Time saving from better coordination	• Spending much time to providing all guidance document without conflict
Placing a utility expert on project design team	• Enhancing utility knowledge of design team	• Additional time spend in early design	• Time and cost saving from more professional design	• More effort spent to satisfy utility constraint, then perhaps needed
Having frequent joint meeting with utility owners as design process	• in Incorporate utility knowledge design process • identification of potential utility issues • Better coordinated	• Level of effort increases for utility staff	• Time savings from better coordination • Money and time savings form avoiding potential issues	• More involvement could slow design
Providing training in highway plan reading to utility owners	• Sufficient utility owner knowledge in highway plan reading • Better coordinated	• Level of effort increases for utility staff	• Time savings from better coordination	• Spending more cost and time for training
Handling each project just by utility coordinator from start to finish	• Better coordinated • Better management	• Cannot control loss of personnel	• Time saving from better management and coordination. • Money saving from better management	• Staffing turnover could leave gaps without replacement, if others are not familiar with the project.
Acquiring sufficient ROW for utility purpose	• sufficient ROW for utility purpose	•	• Time saving for achieving R.O.W for utility purpose • Time saving and less conflict in design step	•

Figure 3.4: Utility Risk Decision Support Tool (Sturgill, et. al., 2014)

3.8. Conclusions

This chapter outlined an array of strategies to mitigate detrimental risks that often emerge during utility coordination. DOTs can use the guidance presented here to select the most fitting utility coordination best practices to lessen the impacts of estimated utility coordination risk. Some practices have universal applicability. For instance, it is critical for DOTs to view utility companies with facilities located along transportation corridors as partners. Agencies should make every effort to improve collaboration and communication with these entities in order to streamline any utility relocation needs on their projects.

Determining the level of risk associated with relocations is an integral part of this effort. Understanding risks and applying appropriate tools and best practices can improve the efficiency of design and construction practices.

Implementing the tools and best practices described in this chapter should a relatively straightforward task. Macro-enabled spreadsheets help simplify decision making by functioning as decision support tools.

Restructuring utilities co-located within and new ROWs to accommodate improvements in the highway system is a complex process. More broadly, utility coordination associated with highway projects poses many challenges to the Kentucky Transportation Cabinet and all DOTs. While the process is controlled by permits, contractual, and legislative regulations, numerous tools and procedures are available to assist the coordination process. The best practices described above can potentially assist DOTs with streamlining and expediting utility relocations. Once these tools are widely adopted, stakeholders will be able to offer feedback on their use. This feedback will be used to refine the tools so they may play an instrumental role in accelerating utility relocations.

3.9. Acknowledgements

The current work was supported by funding from the Kentucky Transportation Cabinet through the Kentucky Transportation Center. The views and opinions expressed by the authors are their own and do not represent the views of the supporting parties.

CHAPTER FOUR: A CASE STUDY OF UTILITY COORDINATION WITHIN A MAJOR DESIGN-BUILD TRANSPORTATION PROJECT

4.1. Introduction

Utility Coordination encompasses active efforts to communicate, share information, and interact productively with all stakeholders on the issue of utility involvement, adjustment, and relocation during all phases of a transportation project's delivery (planning, design, construction, operation, and maintenance). The complexity of utility coordination increases as project size expands. Likewise, in more urbanized areas utility coordination presents more challenges than in rural or suburban landscapes (Thorne, et. al. 1993, Anspach, 2010, Sturgill, et. al., 2017). An emerging strain of argument in the literature on utility coordination suggests that delivery method affects the utility coordination process and that best practices cannot be universally applied irrespective of delivery method. While the National Cooperative Highway Research Program is currently funding a study on this topic, little research exists to support this argument. Many state departments of transportation (DOT) have documented utility coordination practices for use in design-build projects. However, it is rare for these to deviate significantly from the practices used in traditional delivery or consultant-led utility coordination. A recent nationwide survey of state DOTs found that levels of satisfaction with consultant-led utility coordination approaches and utility coordination within design-build projects varies from the satisfaction of traditional in-house utility coordination on design-bid-build projects (Sturgill et al. 2017).

Considerable guidance, policy, and legislation on utility accommodation, relocation, and coordination have been published, however most sources of this information are tailored to traditional project delivery methods (i.e., design-bid-build). And yet state DOTs are increasingly moving toward alternative delivery methods (e.g., design-build and construction manager/ general contractor). The Design-Build Institute of America recorded a 20% market share drop in the use of design-bid-build during the 2005–2013 period in the non-residential construction sector (DBIA, *website,* 2017).

While alternative delivery methods afford transportation agencies opportunities to realize a variety of benefits unavailable with the conventional design-bid-build framework, they also present challenges to processes such as utility coordination. Little documentation, guidance, and support for utility coordination specific to these delivery methods currently exists. Recent work has identified the need for utility coordination guidance applicable to alternative delivery methods due to the unique challenges they present — utility coordination significantly differs in design-build and design-bid-build projects (Sturgill et al. 2017). Noteworthy differences in how utility coordination is undertaken by DOT in-house coordinators, standalone utility consultant coordinators, and project design consultant coordinators have been observed as well (Sturgill, et. al., 2017).

This chapter presents a case study focused on the Louisville-Southern Indiana Ohio River Bridges (LSIORB) project to document and comment on some of the challenges bound up with utility coordination. It offers a unique perspective by documenting how two separate state DOTs approached utility coordination within two subprojects — one subproject relied on the design-build delivery method while the other used a public-private partnership model. The case study validates the argument that delivery method affects the utility coordination process and that best practices cannot be applied universally irrespective of delivery method.

4.2. Background and Project Description

The LSIORB project was a $2.3 billion major infrastructure project anchored by two cable-stayed bridges that cross the Ohio River, connecting Kentucky and Indiana. One bridge links downtown Louisville, Kentucky, to Jeffersonville, Indiana. Its purpose was to reduce congestion along Interstate 65. The second bridge is located east of Louisville and joins Prospect, Kentucky, with Utica, Indiana. This bridge lets travelers from Indiana bypass downtown Louisville and enhances connectivity and access. Figure 4.1 is a map of the LSIORB.

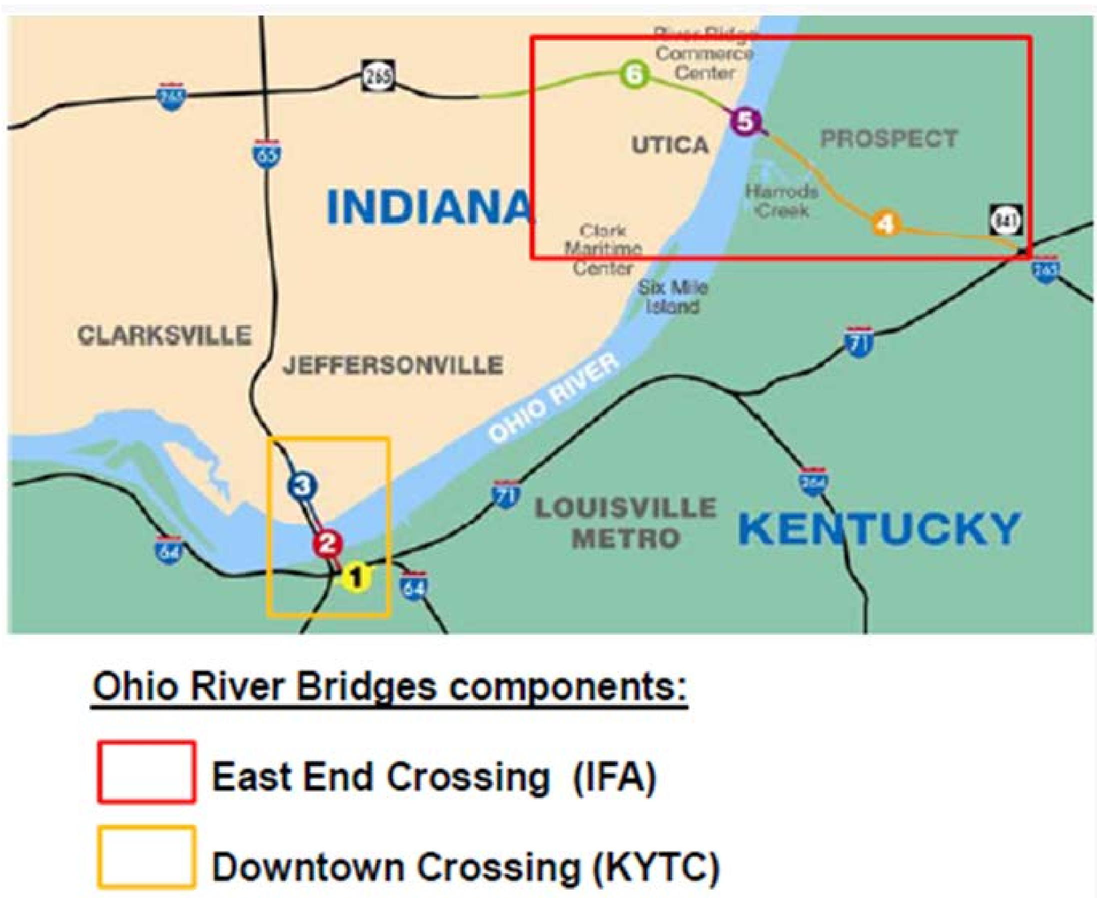


Figure 4.1: LSIORB Area Overview (USDOT TIFIA website, 2017)

Two agencies — the Kentucky Transportation Cabinet (KYTC) and the Indiana Department of Transportation (INDOT) — collaboratively managed this project. This entailed attending to many intricacies and required a bi-state management team as well as team members from the Federal Highway Administration (FHWA). The project was partitioned into six sections, with Sections 1–3 (Downtown Crossing) managed by KYTC using a design-build approach, and Sections 4–6 (East End Crossing) overseen by INDOT, which adopted a public-private partnership (P3) agreement. Walsh Construction Company led the Downtown Crossing design-build team (DBT) while the East End Crossing was sponsored by the Indiana Finance Authority (IFA) as a design-build-finance-operate-maintain P3 project whose concessionaire was WVB East End Partners, a consortium of Walsh Investors LLC, VINCI Concessions, and Bilfinger Project Investment (The Ohio River Bridges, *website*, 2017).

4.3. Overview of LSIORB Utility Coordination

KYTC and INDOT's utility coordination efforts got underway in 2003 with a single consultant coordinator. Following the project award, these efforts were then transferred to the DBT or P3 developer, respectively, with each project having individual project coordinators. KYTC and INDOT adopted individualized approaches to coordinating utility relocations, with both viewing results very positively. This case study was motivated in part by the fact that stakeholders in both agencies expressed satisfaction with the utility coordination process, despite the project's immense scale. The following sections describe individually the utility scenarios of the Downtown Crossing and East End Crossing projects.

4.4. The Downtown Crossing Project and Kentucky's Approach

Twenty-three utility companies had facilities within the limits of the Downtown Crossing project. KYTC managed utility coordination in both Kentucky and Indiana. While the agency completed some preliminary agreements, costs and risks were transferred to the DBT once the project had been awarded. No relocations occurred prior to the award. Post-award the KYTC representative (consultant utility coordinator) observed, documented status, coordinated KYTC permits and INDOT permits, advised KYTC, and confirmed that pay items accurately reflected progress.

The initial design included 94 conflicts affecting 15 utility companies. Revisions to the design eliminated several conflicts. Following revisions, 81 relocations remained (33 in Section 1 and 48 in Section 3). In 2012, KYTC estimated the cost of these revisions at $35 million, with the DBT being responsible for the coordination, costs, and risk of the utility relocations. To incentivize rapid relocations all utilities were reimbursed for their engineering and relocations. The DBT also held monthly utility meetings. Some utility companies reached agreements with the DBT that allowed the DBT to design and construct the relocations, however, most relocations were performed by the utility company and reimbursed by the DBT. All relocations were completed on time and on budget.

4.5. The East End Crossing Project and Indiana's Approach

Seventeen utility companies (6 in Kentucky, 11 in Indiana) had facilities within the project limits of the East End Crossing. INDOT was responsible for the utility coordination in Kentucky and Indiana. Unlike the approach selected by KYTC, INDOT used a shared-risk approach with the P3 developer. Before the project award INDOT completed preliminary engineering agreements with all utility companies impacted by the project. Following the project award, the INDOT representative (consultant utility coordinator) attended meetings, observed project work, provided advice on an as-needed basis, documented status, ensured relocations met accommodation policies, and coordinated the agency's approval of work plans and permits. The representative also notified KYTC when its involvement was necessary to issue permits in Kentucky. All utility relocations were reimbursed to incentivize prompt relocations. In sharing the risks and costs of the relocations, INDOT used three types of relocation agreements (Table 4.1).

Table 4.1: INDOT's LSIORB Utility Coordination Approach

Relocation Type	Description
Type 1	Completed before procuring the P3 developer using conceptual plans. INDOT reimbursed utility companies for relocations.
Type 2	Completed after alignment plans underwent further development by the P3 developer. The P3 developer worked with utility companies to design and complete the relocations in accordance with the utility specifications and requirements. The developer paid all costs.
Type 3	Completed after alignment plans underwent further developed by the P3 developer. Utility companies designed and completed the relocations in coordination with the P3 developer's operations, and the P3 developer reimbursed the utility.

For Type 2 and 3 relations, the P3 developer spearheaded coordination efforts with the utilities. INDOT took on some level of risk with the Type 1 relocations by potentially relocating facilities that may not have been impacted in final design.

Fifty-seven conflicts required relocation on the East End Crossing project. INDOT completed all 17 preliminary engineering agreements at a total cost of $854,000. Twentyfive of the utility conflicts (19 in Section 4 and 6 in Section 6) were relocated before the P3 developer was procured (i.e., Type 1 relocations). In total, $3.5 million was budgeted for advance utility relocation work but only $3.0 million was spent. The P3 developer assumed the costs of the remaining 32 utility relocations. The P3 developer coordinated 20 Type 2 relocations (6 relocations in Section 4 and 14 in Section 6) and 12 Type 3 relocations (5 relocations in Section 4 and 7 in Section 6). The P3 developer conducted monthly utility meetings. All relocations were completed without delay or claims.

4.6. Case Study and Analysis

The development and construction of transportation projects on the scale of the LSIORB project requires agencies to marshal a large number of resources and involves the coordination and completion of many complex processes. Utility relocation is a critical and time-consuming aspect of these projects. Because of its complexity and scale, the LSIORB project demanded the use of innovative techniques to mitigate impacts and the relocation of utilities. Given the use of many new techniques, the ways in which they were put to use were catalogued to benefit not only KYTC and INDOT (so they may be incorporated into standard practices and procedures) but also other DOTs attempting similarly ambitious projects.

4.7. Methodology

To understand the perceptions of the utility coordination process within the LSIORB project, data were collected through stakeholder interviews, group discussions, and audience polling. Based on data gathered in these forums, lessons learned and best practices for utility relocation on projects with alternative delivery methods were recorded. Information collected as part of an earlier national synthesis study (Sturgill et. al., 2017) demonstrated the importance of preparing utility coordination guidance specific to alternative contract delivery methods.

Members of the KYTC, INDOT, and the general engineering consultant leadership teams were interviewed. Additionally, the Kentucky Transportation Center and the LSIORB utility coordination team held a focus group with utility companies to discuss best practices. Eleven utility companies attended, with additional companies invited to provide feedback via correspondence. Anonymous polling was used to query focus group members. This was followed by an open facilitated discussion to gather additional feedback.

4.8. Findings from Anonymous Polling

Based on responses to several demographic questions, data were initially filtered according to the operating base of the utility company (Kentucky or Indiana), project sections on which they had facilities located, mode of facilities (e.g., overhead, underground), ownership of utility (i.e., public or private), and facility type (e.g., gas, water, electric).

Utility company representatives were asked to evaluate the level of success their firms experienced working with the DBT (Downtown Crossing) and P3 developer (East End Crossing). Success was defined as meeting goals related to communication, cooperation, timeliness, and budget. All eligible respondents said their level of success was *good* or *very good* working with the DBT on the Downtown Crossing. Conversely, representatives reported slightly less levels of success working with the P3 developer on

East End utility relocations. Notably, respondents who ranked both the DBT and P3 developer assigned the same or lower score to the P3 developer in all cases. No respondent said they experienced greater success with the P3 developer than the DBT. One explanation for this disparity is that the involvement of the consultant utility coordinator differed between the two subprojects. This finding is consistent with early work that demonstrated the utility coordination contract type and utility coordinator experience level can affect the overall utility coordination experience (2017). In this case, the utility coordinator for the DBT had more experience with the project and in utility coordination.

Respondents also compared the quality of utility coordination practices used on the LSIORB project (design-build) to those employed on traditional design-bid-build projects. Although there was no group consensus, most respondents said the utility coordination practices on the LSIORB project were improved or much improved (Figure 4.2). Respondents from public and underground utilities responded less favorably than the representatives from private companies holding aerial assets. Responses from DOT representatives were not consistent either, with those respondents selecting answers from across the entire spectrum of options.

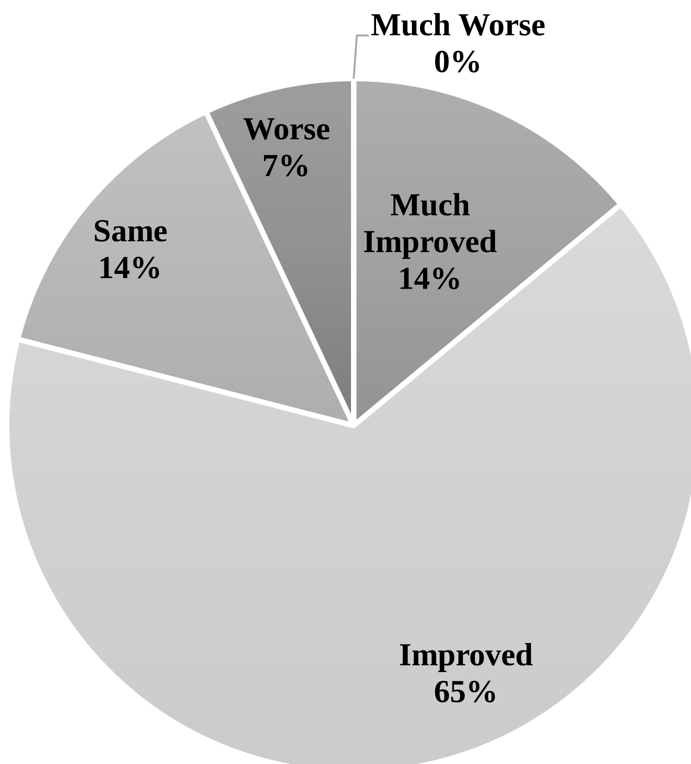


Figure 4.2: Comparing Utility Coordination Practices of LSIORB versus Design-Bid-Build Projects

Respondents also commented on the effectiveness of reimbursing all relocations and project's impact on utility company resources (Figure 4.3). Over 70% of respondents from privately owned utilities said their companies incurred some impact from the reimbursements. The DOT representatives largely felt that reimbursements had little impact. Respondents overwhelmingly endorsed continuing the practice of reimbursements. Comments from public utility companies indicated that in some cases budgetary constraints made these reimbursements necessary to fund relocations. Respondents from private utilities said the practice was effective, but they also noted that there would not always be a perceived benefit with respect to relocation speed or prioritization based on the reimbursement. Preliminary polling responses led to more detailed responses during open discussion.

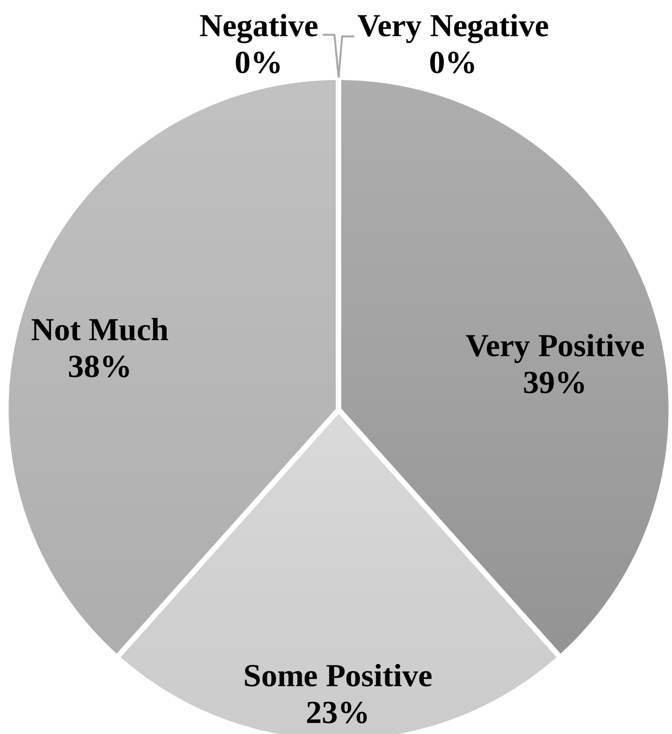


Figure 4.3: Impact of Reimbursements on Utility Company Relocation Response

4.9. Findings from Open Discussion

The facilitated discussion sought to elicit feedback on practices found to be beneficial and which potentially should be incorporated into standard practice. Respondents from utilities viewed working with large contractors that were part of the design-build team or P3 developer favorably. Specifically, respondents commented that staff from Walsh Construction Company was very professional and accommodating. Utility company representatives said the project had the following characteristics:

- **Excellent Communication —** Regular monthly meetings were held with additional communication as needed.
- **Conflict Resolution —** A formalized process for resolving conflicts helped alleviate the risk of disputes.
- **Professionalism —** Utility companies felt they were a partner in the project and not simply in the way.

Respondents also highlighted benefits of the design-build delivery method which are not typically present on conventional design-bid-build projects. The design-build structure facilitates utility coordination because utility companies participate in projects from their early design phases, which carves out more opportunities to share knowledge and better fuse construction and any needed utility relocation activities. The use of design-build minimizes impacts, enables recognition of long-lead issues, fosters more effective prioritization of relocations. Brining the construction contractor onboard during the design phase also improves understanding of the construction, phasing and project timeline. This also assists with the more accurate prioritization of utility relocations, improves communication and coordination among the utilities involved, and bolsters coordination with construction.

Another topic of discussion was INDOT’s use of three relocations schemes. Respondents unanimously praised Type 1 relocations, observing that DOTs and utilities alike want to complete required relocations well in advance of road construction to avoid conflicts. The only risk Type 1 relocations present is related to alignments — stakeholders must ensure all relocated utilities are outside possible construction alignments. Type 2 relocations required the use of some level of consultant services by the P3 developer. Some companies viewed this as a form of assistance, while others found it undesirable and potentially impermissible within their organization. Type 3 relocations entailed the coordination of utility companies with the P3 developer once plans were in advanced stages. Companies were slightly more familiar with this practice, with the only real difference being they worked with the developer instead of the DOT.

Utility company representatives stated that reimbursements — when not required — should be considered carefully. When relocations on highway projects compete with new service installations of utilities, the relocation reimbursement is not as lucrative as new revenue-generating facilities. Reimbursements offer a justification to complete the work but do not provide the resources. If a company is unwilling to take on more resources, temporary manpower for instance, reimbursements will be of little help. Respondents commented that firm dates of priority are much more valuable than the reimbursement. If the reimbursable work has been subcontracted (e.g., typical field relocation efforts) it is unlikely to provide as much benefit. What may be beneficial in most cases is reimbursement for design services.

Attitudes regarding incorporation of relocation fieldwork into roadway contracts varied. While this has become common practice with some utilities (water, sewer), for other utilities, many concerns and perhaps even legal barriers exist (e.g., cases involving union labor). Where this arrangement is used, respondents said the utility should inspect and approve the contractors performing the work. This therefore requires some resources from the utility company, so it is not the complete elimination of need of their confined resource. Aerial utilities are governed by specific accounting rules, and installations and removals must be tracked carefully. This could raise major accountability issues. Most respondents agreed that clearing and grubbing, excavation, and some conduit duct bank construction would be acceptable while introducing few concerns or drawbacks. Having contractors set poles would be unreasonable. Overall, a consensus emerged holding that actual gains would be significantly lower than the anticipated benefits of using these practices.

4.10. Conclusions

Based on data collected through polling, interviews, and focus group discussions, this chapter presented guidance applicable to utility coordination on design-build transportation projects. It fills a significant knowledge gap in the literature on utility coordination. Until now, exceedingly little documentation, guidance, or support for utility coordination specific to design-build has been available. Utility coordination on design-build projects benefit immensely from the following:

- Regular communication among stakeholders
- Establishing a formalized method of conflict resolution
- Maintaining a strong commitment to professionalism
- Fostering strong partnerships among all stakeholders

Research presented in this chapter, as well as Sturgill et. al. (2017), demonstrates the importance of using a certification or prequalification to procure a consultant when consultant- led utility coordination has been adopted. Ideally, that consultant should be retained under a standalone utility coordination contract rather than under the auspices of a general design consultant contract. DOTs should also establish specific evaluation methods and criteria for standalone utility consultants.

As the information compiled in this chapter makes clear, DOT personnel and utility company representatives harbor differing opinions about utility coordination on design-build projects. When asked about the level of success they experienced with utility coordination on the LSIORB project, the responses for DOT personnel and utility company representatives diverged. Both findings confirm earlier work that detected similar nationwide trends (Sturgill et. al. 2017).

Guidance for utility coordination on design-build projects should continue to be refined. Typically, design-build teams working on utility coordination have short-term and bottom-line focus while utility coordination led by DOTs is likely to emphasize the long-term. One example is the installation of a utility facility that requires periodic access under a pavement structure. While a design-build team utility coordinator may allow such an installation to avoid schedule delays, a DOT utility coordinator would consider the long-term effects of pavement cuts and likely mandate use of a different location. Nevertheless, the design-build procurement method will continue to be used on projects of varying complexity and utility coordination on these types of projects is likely to be viewed as part of the design services of the design-builder. Strategies for outsourcing utility coordination and establishing best practices suited to design-build projects will be helpful to the industry. This chapter has taken a first step toward articulating strategies and best practices; however, further works remains to be done.

4.11. Acknowledgements

The current work was supported by funding from the Kentucky Transportation Cabinet through the Kentucky Transportation Center. The views and opinions expressed by the authors are their own and do not represent the views of the supporting parties.

CHAPTER FIVE: CONCLUSION

5.1. Summary of Findings

The processes departments of transportation rely on to manage the impacts and conflicts highway construction or rehabilitation projects have with existing or impending utility infrastructure are collectively referred to as *utility coordination*. This dissertation has consistently defined utility coordination as efforts to communicate, share information, and interact productively with all applicable stakeholders regarding the utility involvement, adjustment, and relocation during all phases (planning, design, construction, operation, and maintenance) of a transportation project — from development to delivery (Thorne, et. al. 1993). Project stakeholders routinely misapprehend the complexities of utility coordination processes. And many transportation practitioners mistakenly conflate utility coordination and utility relocation. This conflation is problematic because it suggests the objective of any interaction between the roadway project and utility facilities necessarily entails the relocation of the utility facilities to accommodate the roadway project as it was originally designed. Preparing highway designs without attending to possible utility impacts is an antiquated highway project development approach. Similar approaches were used to negotiate environmental conflicts on highway projects until the implementation of the National Environmental Protection Act, which increased the complexity of project development by compelling stakeholders to satisfactorily address environmental issues. While the same legal protections may not apply to utilities facilities, the costs and schedule impacts that utility relocations have on highway projects are providing the impetus for new strategies in coordinating highway project and utility conflicts.

Utility coordination significantly influences timelines, budgets, risks, and stresses associated with the delivery of a transportation project, and many strategies have been developed to optimize these efforts. Effective utility coordination improves the delivery of transportation and other capital facility projects and reduces project risks posed by delays, safety hazards, and cost overruns. Researchers have attempted of late to enhance utility location technologies and procedures, establish tools and best practices to facilitate utility coordination, and proceduralize risk management relative to utility coordination; however, no consensus has been reached on how to integrate these efforts into an effective standard of practice. This is partially an artifact of state departments of transportation (DOT) and utility companies being forced to contend with staffing shortages, resource issues, and budgetary constraints. Together, these factors drive up the level of complexity in utility coordination. Similarly, continually evolving legislation and statutory requirements, such as the Buy America Act, have complicated utility coordination and relocation lead times. The blossoming popularity of alternative contracting methods, such as design-build procurement, which aim to compress project schedules and shorten project phases, have also introduced new challenges for utility coordination. With so many aspects of utility coordination and utility engineering in a state of uncertainty, understanding the risks associated with utility coordination and developing best practices and tools to mitigate those risks is more important now than ever.

The work presented in this dissertation sought to provide stakeholders with the tools and information to improve and expedite utility coordination work on transportation projects while ameliorating utility-related risks. The three substantive chapters worked toward this goal through 1) the development of a quantitative model that stakeholders can use to assess utility-related risks during the early stages of project development, 2) cataloguing best practices according to risk level to promote a smoother utility coordination process, and 3) highlighting best practices for utility coordination on projects that take advantage of alternative contracting methods. The next three sections briefly revisit the key findings of each chapter.

5.2. Findings from Quantifying Utility Risk in Highway Project Development

Utility risks include many factors which affect the ability of transportation agencies to deliver projects on time and within budget. Often, the quantity and quality of information available on utility facilities during the early phases of project development is limited and uncertainties regarding its accuracy abound. Complicating matters is the fact that all utility-related risks are managed through utility coordination processes, which themselves are subject to restrictive legislative requirements. Effective utility coordination and risk management demand an early risk assessment from project managers. Early risk assessments can improve the delivery of transportation and other capital facility projects and reduce project risks posed by delays, safety hazards, and cost overruns. Furthermore, estimating the utility risks associated with a project can facilitate prioritization activities.

Chapter 2 presented a methodology and tool DOT stakeholders can use to perform an early assessment of utility coordination and relocation risks. It also described how to select best practices based on the level of risk identified on a project so as mitigate risks and undertake prioritization based on project characteristics. Findings from this chapter established the bases of an automated Excel-based tool delivered to the Kentucky Transportation Cabinet (KYTC).

Measuring a project's utility-related risks is indispensable for determining the level of effort utility coordination requires. Understanding utility-related risks and applying appropriate tools and best practices to mitigate those risks fosters more efficient design and construction practices. The methodology and tool outlined in Chapter 2 can assist DOTs in allocating utility coordination resources while also providing insight into which projects are best suited to consultant-led utility coordination and other resource driven strategies.

It is critical to bear in mind that the tool should not be used to develop comprehensive assessments of utility-related risks. Rather, its focus is squarely on those processes deemed most essential based on their impact on project delivery costs and schedules. The methodology and tool leverage readily available project information that stakeholders can easily gather in the early stages of projects. Future research can build from the findings and products discussed in Chapter 2. For example, risks due to uncertainties in utility facility locations, coordination and relocation schedules, and utility relocation cost estimates are also particularly critical and warrant greater scrutiny. Detailed knowledge of the analysis, assessment, and mitigation of utility related project risks across varying project stages remains elusive as well. This analysis and standardization of risk assessment and management approaches will be a fruitful research area in the coming years. Nonetheless, in demonstrating that project utility risk can be quantified and then formalized into decision support tools, the methodology and tool introduced in Chapter 2 have established a path future research can follow. Future work should focus on enhancing the methodology and tool, refining them through analysis of richer datasets, so they can be used to assess risk throughout project lifecycles and no longer restricted to high-level evaluations.

5.3. Findings from Effective Utility Coordination through Alignment of Best Practices

Drawing from literature review, surveys, and interviews with stakeholders from DOTs and non-DOTs, Chapter 3 inventoried strategies to mitigate the negative consequences of utility coordination. When utilities are co-located within and near road ROWs, restructuring utility facilities to accommodate improvements in the highway system is undoubtedly challenging for KYTC and DOTs around the country. Although the utility coordination process is controlled by permits, contractual obligations, and legislative regulations, there are numerous tools and procedures available to assist the coordination process.

The tools and best practice enumerated in Chapter 3 provide much-needed guidance DOT stakeholders can use in their attempts to select utility coordination best practices based on the estimated utility coordination risk for a given project. Some practices have universal applicability. For instance, it is critical for DOTs to conceptualize utility companies with facilities located along transportation corridors as partners. Transportation agencies should strive to improve collaboration and communication with utility companies, as this will streamline any utility relocation needs. Determining the level of risk associated with utility relocations is a fundamental aspect of this effort. Understanding risks and applying appropriate tools and best practices can promote more efficient design and construction practices. Although implementing the tools and best practices laid out in Chapter 3 should be an uncomplicated task, structured spreadsheets were developed to serve as decision support tools. Several of the tools reviewed in this chapter were designed specifically for KYTC to provide the organization with guidance and strategies for deploying best practices based on a project's risk level. As these tools and best practices gain purchase among transportation stakeholders, feedback from users will be used to refine their form and content, so they can keep pace with the continually evolving world of highway project delivery and utility coordination.

5.4. Findings from A Case Study of Utility Coordination within a Major Design-Build Transportation Project

As noted at the outset of Chapter 4, currently there is little documentation, guidance, and support available for utility coordination on design-build projects. Based on anonymous surveys, focus group discussions, and interviews with DOT and consultant stakeholders who worked on the Louisville Southern Indiana Ohio River Bridges (LSIORB) project, Chapter 4 offered guidance that can be applied to improve utility coordination on design-build projects, although many of the best practices introduced are relevant to any transportation project. There are four guiding principles to achieve effective utility coordination on design-build projects:

- Regular communication among stakeholders
- Establishing a formalized method of conflict resolution
- Maintaining a strong commitment to professionalism
- Fostering strong partnerships among all stakeholders

Analysis of the LSIORB project and information gleaned from previous research (e.g., Sturgill et. al. 2017) also indicate the importance of establishing a certification or prequalification process when consultant-led utility coordination is used on a project. Ideally, the consultant leading utility coordination should be retained under a standalone utility coordination contract rather than as a general design consultant. Further, evaluation criteria and methods should be in place to assess consultant performance.

Data from the LSIORB project demonstrated that opinions differ among DOT representatives and utility company stakeholders on the issue of utility coordination on design-build projects. Specifically, they reported levels of success with a public-private partnership developer were lower than with a design-build team (Sturgill et al. 2017). Using a design-build team for utility coordination on a design-build project will likely produce results that are focused more on the short term and bottom line than when a DOT leads utility coordination, which tend to emphasize longer-term performance. Based on recent trends, it is inarguable that design-build procurement will grow more prominent in the future and that utility coordination will likely be viewed as part of the design services of the design-builder. Improved, strategies and best practices related to outsourcing utility coordination on design-build projects will prove helpful to the industry. The information presented in Chapter 4 makes the first steps toward identifying and disseminating these strategies and best practices.

5.5. Research Contributions

The findings of Chapters 2 through 4 make a significant contribution to the existing literature on utility coordination. These are summarized below.

- **Highway Project Attributes Provide Opportunities to Quantitatively Estimate Levels of Utility Related Risks**

Work presented in this dissertation confirms that data on project characteristics, historic utility schedule, costs, and their relative escalations can be used to generate quantitative models capable of estimating utility risk levels as well as schedules and costs. Although previous work was identified that focuses on assessments of utility-related risks, no published literature was found that proposes a quantitative model to make preliminary estimates of utility project risk. The use of such models is most appropriate during the early stages of project development. At later stages, project teams have sufficient information to produce more robust and precise risk assessments based on detailed knowledge of a project's attributes and progress to date. Nevertheless, equipping project teams with a method to estimate project risks early on in project development using only approximate estimates of utility phase cost, the number of utilities involved, and project type will allow them to make more informed decisions about the allocation of resources to utility coordination. In the case of higher risk utility coordination, preliminary estimates of risk can help project teams avoid or minimize potential difficulties.

- **Best Practices can be Aligned to Highway Project Utility Risk Levels to Uniquely Mitigate Associated Risks**

Another key contribution of this dissertation is describing how to select best practices for utility coordination based on user-defined risk levels. When project development teams combine their preliminary risk assessments with selection of best practices, they are able to select the tools that are most applicable to the utility-related risks they face on their projects. The method of aligning best practices and user-defined risk levels introduced in this dissertation is specific to Kentucky, and it was vetted by Kentucky subject matter experts. Therefore, it stands as a valuable contribution that will improve the efficiency of utility coordination practices in Kentucky. However, the general approach could be used in other states; it would need to be tailored to those states' legislation and the business practices of their DOTs. The preliminary risk assessments and the best practices outlined can be useful to project development teams and specifically utility coordination staff. These utility coordination staff often encounter resource issues and constraints when attempting to manage a multitude of projects, each of which has a different level of utility-related conflicts. Understanding the potential utility risk on a project facilitates prioritization of utility coordination efforts for that project relative to an agency's highway program. Aligned best practices ensure the resources needed to perform utility coordination are allocated in the most efficient means available.

- **The Effectiveness of Best Practices for Utility Coordination have Varies Among Stakeholders**

A key finding of this research is that among stakeholders utility coordination practices are neither universally important nor uniformly effective. Interviews with KYTC's utility coordinators and their stakeholder utility companies revealed a number of disparities in how each party conceptualized the other stakeholder's perspectives. For example, Cabinet stakeholders believed it wasteful to consider highway plan reading training for utility company stakeholders, assuming they are already proficient in plan reading. Yet, utility company representatives said that plan reading would be one of the most beneficial trainings that KYTC could offer them. Although utility companies have staff able to read utility-specific plans, the complexities of KYTC plans introduced problems for them. A nationwide survey produced similar findings (see Table 3.3 in Chapter 3) with respect to divergent attitudes among DOT and non-DOT stakeholders. For example, just 14% of survey respondents at DOTs felt that the use of utility corridors was a top effective practice, but 50% of utility company respondents considered it a top practice. At a more conceptual level, highlighting these disparities and misaligned stakeholder objectives may be useful in strengthening utility coordination efforts. Stakeholders must partner, working together to establish consistent utility-related objectives for projects based on a firm grasp of risks, impacts, and their potential resolutions. Vigorous partnerships among stakeholders during the utility coordination process can help streamline the project development process, minimizing delays or impacts arising from utility-related issues.

- **Best Practices for Utility Coordination are Not Universally Applicable Across Contracting Methods**

DOT representatives and utility company stakeholders also harbor different attitudes regarding utility coordination on design-build projects. As the LSIORB project demonstrated, stakeholders experience different levels of success with a public-private partnership than with design-build teams. As such, strategic guidance for utility coordination on design-build projects must transcend recommending the mere avoidance of complex situations. The short-term, bottom-line-focused orientations of design-build teams lead to the neglect of issues that would be addressed by DOT-led utility coordination, which generally have a long-term focus and attempts to minimize conflicts that may arise during future maintenance and construction activities. With design-build procurement gaining popularity, guidance for design-build specific utility coordination must continue to be developed and refined.

- **The Effectiveness of the Approaches Used for Consultant-led Utility Coordination Varies**

The data collected for and analyzed throughout this dissertation also confirm that satisfaction levels with consultant-led utility coordination depend what approach a consultant adopts. Based on this finding, it is evident that consultant-led utility coordination should be conducted by third party consultants specializing in utility coordination or those with utility coordination experience on the staff of the principal consultant. If consultant-led utility coordination is performed by inexperienced or unqualified individuals, DOT utility coordination staff are relieved of few, if any, burdens. DOT stakeholders indicated the use of consultant-led utility coordination at their agency was the product of not having recourse to use in-house utility coordination resources. When consultants or utility companies have to rely on DOT staff it renders the entire consultant-led utility coordination pointless. The most effective approach to quality consultant-led utility coordination lies in identifying the utility risks posed to a project and consulting out those jobs which entail lower risks relative to utility and ROW. Agencies should also establish a substantive prequalification process for consultant-led utility coordination. Requiring consultants to attend state-specific training for utility coordination could serve as part of that prequalification.

5.6. Research Limitations

This study is not without its limitations. A key limitation of this study is that much of the research and many of the findings are specific to Kentucky, which has unique policies, legislative requirements, and practices related to utility coordination. Feedback collected from subject-matter experts was mostly focused on Kentucky. Other states will have their own statutes and policies that are applied to utility coordination. Thus, while some of the best practices and tools could be used by other state DOTs, they may require slight modifications to adapt them to the agency and legal contexts of those states.

Another limitation of this study is that interactions between utilities and highways are currently very fluid with respect to legislation and practices. A great deal of emphasis is placed on telecommunications, with the expansion of fiber optic networks and small/microcellular infrastructure in recent years. This has increased the complexity of utility coordination. Also, there have been a concerted focus on legislation and policy to address this area. As legislation and policies change, the applicability and effectiveness of some best utility coordination practices may diminish. Attempting to apply solutions to a dynamic industry is difficult and therefore some of the recommendations may only have short-term applicability.

Lastly, this research — like any study — has methodological limitations. Its conclusions are strictly drawn from literature reviews, surveys, interviews, and focus group discussions. Innovations in how information pertaining to utility coordination and utility conflicts is collected may emerge. Many DOTs are beginning to implement concepts advocated by the SHRP2 R15B research effort and are putting utility conflict management into practice. Use of these approaches results in the collection of more robust datasets on project utility risks. This could open up new horizons for utility risk studies.

5.7. Opportunities for Future Research

Potential research opportunities have been mentioned throughout this dissertation. However, working to develop utility coordination training and curricula is one area with maybe the most pressing needs. New trainings will significantly benefit stakeholders at utility companies and DOTs. Education, training, and certification are particularly important for dealing with consultant-led utility coordination and coping with resource constraints. Very few training opportunities exist for those interested in utility coordination, and post-secondary educational offerings are scarce. Given the recent uptick in interest in utility engineering by organizations such as the American Society of Civil Engineers Utility Engineering and Surveying Institute, aspiring civil engineers with an interest in highway transportation must have access to introductory-level coursework on utility design, management, and coordination.

APPENDICES

Appendix A: Kentucky SPR 13-460: Methods to Expedite and Streamline Utility Relocations for Road Projects—Interview Questionnaire

KYSPR 13-460: Stakeholder Interview/Questionnaire

Question 1: Based on the best practices listed (identified from literature review), with what frequency do you estimate that the KYTC makes use of this practice?

	Best Practices	**Never**	**Rarely**	**Sometimes**	**Often**
1	Train project managers and other design team personnel on utility issues.				
2	Train consultants and utility owner personnel in utility coordination processes and issues				
3	Consider paying utility relocation design costs regardless of prior rights to maintain coordination between available space and project timing.				
4	Consider task-order contracts with expert consultants versed in utility and highway design as an additional resource for design alternative suggestions.				
5	Develop an early utility cost estimate based on worst case assumptions and continually revise it as design progresses.				
6	Use technology tools such as Google Earth, roadway video logging, and GIS systems to get early visualization of utilities in the planning stages of projects.				
7	Place a utility expert on the project design team as early as possible and keep them involved and informed as the design develops.				

	Best Practices	Never	Rarely	Sometimes	Often
8	Develop a standardized format for identifying and resolving utility conflicts and continually revise it as the design progresses.				
9	Develop a mechanism to capture any changes to the existing utility facilities performed by utility owners or contractors on the project as design develops. Update the utility mapping on the design plans as the utility data changes.				
10	Develop or utilize a GIS system to store, manage, and recall utility information gathered during plan development and during utility relocations and new installations during construction.				
11	Install or require utilities to install radio frequency identification markers on nonmetallic utilities during utility relocations or new installations.				
12	Develop a catalogue or database of historical utility relocation costs to generate the best possible cost estimate. Update this database on a regular basis, but do not exceed annually.				
13	Develop visualization aids for utility pole and structure relocation costs.				
14	Develop catalogues and visualization techniques to assist designers in alternate design				

	Best Practices	Never	Rarely	Sometimes	Often
	possibilities.				
15	Develop a rigorous pre-qualification for SUE consultants that address their technical qualifications.				
16	Develop a screening tool to assist and formalize the process of selecting the appropriate Utility Quality Levels for utility mapping. This might be an iterated process that is re-evaluated as additional detail is added to the design plans.				
17	Build on cost–benefit studies already performed to evaluate the cost-effectiveness of SUE.				
18	On projects where it is known in advance that utilities are a significant time or cost factor, get QLB (Quality Level-B) mapping as early as possible, preferably at time of topo development. Consider the underground utilities as a topo feature that is underground.				
19	Have frequent joint meetings with utility owners as design progresses to get their input on relocation issues and to make certain they coordinate their relocation designs with the available space.				
20	Provide training in highway plan reading to utility owners.				

	Best Practices	Never	Rarely	Sometimes	Often
21	Ensure that all guidance documents do not conflict with each other and that they use the same standard terminology as it relates to utilities.				
22	Use or consider establishing utility corridors for utilities crossing major highways or located longitudinally along highway ROWs.				
23	Acquire sufficient ROW for utility purposes.				
24	Advance relocation of utility work before highway construction begins.				
25	Each project is supposed to be handled by a utility coordinator from start to finish. Any issues that may be related to the construction will be discussed by operational planning meetings.				
26	DOTs share annual bills and monthly schedules with UCs, so that UCs can plan and budget accordingly.				
27	DOTs provide incentive to UCs for early utility relocation and permit the opportunity to reimburse a utility for the cost of relocating its facility early.				
28	Utility impact matrix is used to list all utility conflicts and a SUE consultant is needed to provide the corresponding				

	Best Practices	Never	Rarely	Sometimes	Often
	recommendations.				
29	Work site utility coordination supervisor is needed to coordinate utilities during the construction phase on every project that uses SUE.				
30	Use Subsurface Utility Engineering (SUE) for projects where underground utilities are present and high quality levels of information are needed for design purposes.				
31	Require utility company certification of record drawings and encourage development of a CAAD database system and electronic transfer system.				
32	Work with local governmental jurisdictions to establish pavement cutting criteria and backfill requirements.				
33	Provide utility companies with long range highway construction schedules.				
34	Host meetings with utility companies to discuss future highway projects.				
35	Recognize the importance of long-range highway/utility coordination.				
36	Organize periodic (monthly, quarterly, annual) meetings with utility owners within				

	Best Practices	Never	Rarely	Sometimes	Often
	municipality, county, or geographic or highway planning region.				
37	Solicit similar information on utility owner's capital construction programs, particularly where a utility's planned expansion or reconstruction may encroach on or coincide with a planned highway project.				
38	Consider using the long range planning meeting as a convenient forum to discuss other highway/utility issues, such as accommodation policies, reimbursement, etc.				
39	Provide utility companies with a notice of proposed highway improvements and preliminary plans as early in the development of highway projects as possible.				
40	Involve utility companies in the design phase of highway projects where major relocations are anticipated.				
41	Conduct on-site utility meetings or utility plan-in-hands with utility companies to determine utility conflicts and resolution.				
42	Participate in local one-call notification programs to the maximum extent practicable per state law.				

	Best Practices	Never	Rarely	Sometimes	Often
43	Invite utility companies to pre-construction meetings and encourage or require utility companies, contractors, and project staff to hold regular meetings, as deemed appropriate, during the construction phase of a project.				
44	Use standardized utility agreements.				
45	Initiate separate contracts for advance roadway work on selected projects prior to utility relocation.				
46	Set forth responsibilities for appropriate action to reduce delays to contractors.				
47	Provide utility special provision language in the construction contract.				
48	Avoid late plan changes.				
49	Have highway contractors relocate utility and municipal facilities, when possible.				
50	Pay non-reimbursable utilities for relocation design.				
51	Use DOT consultants for utility relocation design.				
52	Identify utility avoidance areas during conceptual design.				
53	Identify long lead items related to utility relocations in early design				

	Best Practices	Never	Rarely	Sometimes	Often
	stages.				
54	Define utility corridors during project design.				

Other Best Practices Not Listed:

Question 2: Based on the best practices not currently used by KYTC, what are the top 5 you feel could provide the most benefit if added to normal KYTC procedure?

Question 3: List the major delays you perceive in utility relocations and indicate whether these are caused by KYTC, the utility company, or both?

Major Sources of Delay in Utility Relocations	Responsible Party

Question 4: List the major delays you perceive in utility relocations and indicate whether these are caused by KYTC, the utility company, or both?

Major Sources of Delay in Utility Relocations	Responsible Party

Question 5: Do you have any ideas that could streamline or expedite utility relocation on KYTC projects?

Appendix B: Kentucky SPR 13-460: Methods to Expedite and Streamline Utility Relocations for Road Projects—Survey Questions and Results Summary

KYSPR13-460 Survey and Response Summary

1. Which group best describes yourself? (Demographic Assignment)

26 person attended in Utility Session 1,15 person (58%) are from KYTC-Utilities, 4 person (15%) are from KYTC-Design, 2 person (8%)are from KYTC-Other, 2 Person (8%) are from Consultant-Utilities, 2 person (8%)are from Consultant-Design and 1 person is from a group we called it " Other".

2. How helpful would you perceive training offered for project managers or design personnel concerning utility issue?

44% of all interviewees believe that training offered for project managers or design personnel concerning utility issues would be extremely helpful while 36% believe it would be somewhat helpful. Just 4% of all interviewees believe this training would not be helpful.16% are not sure it is helpful or not helpful.

From those interviewees that described themselves as KYTC-Utilities 40% believe extremely helpful.47.67% believe somewhat helpful and nobody of KYTC-Utilities believe training would not be helpful.13.3% of KYTC-Utilities are not sure about the helpfulness effect of training for project managers or design personnel concerning utility issues.

75% of KYTC-Design believe training would be extremely helpful for project managers and design personnel and 25% of them believe it would be somewhat helpful.

From those interviewees that describe themselves as KYTC-Others, 50% believe this training could be extremely helpful and 50% of them believe it is not helpful.

100% of Consultant-Utilities believe training is extremely helpful.

All consultant-Design are not sure about the helpfulness effect of training.

3. How helpful would you perceive training for utility owners on highway plan reading to be?

60% of all believe that training for utility owners in reading highway plans would be extremely helpful but 100% of consultant utility, 40% of KYTC-Utilities, 75% of KYTC-Design, and 50% of KYTC-Others believe the extremely helpful effect of training for utility owners.no body of Consultant-Design believe that training for utility owners in reading highway plans would be extremely helpful.

4. How often does KYTC host meeting utility company for the purpose of short-term planning?

8% of all interviewees believe KYTC never host meeting with utility companies for purpose of short-term planning. 32% of all believe KYTC host this meeting rarely, and 48% believe KYTC host this kind of meeting sometimes. 12% of all interviewees believe KYTC often host meeting with utility companies for the purpose of short-term planning.

21% of KYTC-Utilities believe KYTC host meeting rarely and 57.14% of them believe somewhat while21% of KYTC-Utilities interviewees believe KYTC hosts meeting often

25% of KYTC-Design believe KYTC never hosts meeting and 50% believe it hosts rarely, while 25% of them believe KYTC often hosts meeting with utility companies for the purpose of short-term planning.

100% of consultant-Utility believe KYTC host meeting sometimes.

100% of KYTC-Other believe KYTC host meeting rarely.

50% of Consultant-Utility believe KYTC never hosts meeting and 50% of them believe it hosts sometimes.

All other interviewees believe KYTC rarely host meeting for the purpose of short-term planning.

5. How often should KYTC host meeting with utility company regarding upcoming project or issue?

4% of all interviewees believe KYTC should host weekly meeting with utility companies and 50% of all believe KYTC should host monthly meeting, 46% of all interviewees believe it should host meeting quarterly.

From KYTC-Utilities interviewees just 7% believe KYTC should host weekly meeting, and 47% of them believe monthly meeting while 47% of them believe KYTC should host meeting with utility company quarterly.

Half of KYTC-Design believe monthly meeting and other half believe quarterly meeting.

Like KYTC interviewees, half of KYTC-Other think monthly meeting and other 50% think quarterly meeting should be hosted by KYTC.

All consultant-Utilities think KYTC should host meeting monthly.

50% of consultant-Design believe monthly meeting and 50% believe KYTC should host meeting with utility companies quarterly.

6. How often does KYTC host meeting with utility companies for the purpose of long-term planning?

12% of all interviewees think KYTC never hosts meeting with utility companies for the purpose of long-term planning.

52% of all interviewees believe KYTC rarely hosts meeting with companies for the purpose of long-term planning while 32% of them think KYTC hosts sometimes and just 4% believe KYTC often hosts meeting with companies for the purpose of long-term planning.

53% of KYTC-Utilities interviewees believe that KYTC rarely hosts meeting and 40% of them think KYTC hosts meeting sometimes with companies for the purpose of long-term planning.7% off KYTC-Utilities believe KYTC often hosts meeting for long-term planning

67% of KYTC-Design interviewees think KYTC never hosts meeting for long-term planning while 33% of them think it rarely hosts.

From KYTC-Other, 50% believe KYTC never hosts meeting and the other 50% believe it rarely hosts meeting with utility companies for the purpose of long-term planning.

Half of Consultant-Utilities believe KYTC rarely hosts and the other half think KYTC sometimes hosts meeting.

All Consultant-design interviewees believe KYTC rarely hosts meeting with companies for purpose of long-term planning.

7. How would you rate the level of communication between KYTCand Utility Company?

From all interviewees, 12.5% rate the level of communication between KYTC and Utility Company as more than adequate, 45.83% rate it as adequate, 37.5% rate it as inadequate and 4% rate it extremely inadequate.

From all KYTC-Utilities interviewees, 21.43% rate the level of communication between KYTC and Utility Company as more than adequate,57.14% rate it as adequate, 21.43% rate it as inadequate.

From all KYTC-Design interviewees, 25% rate the level of communication between KYTC and Utility Company as adequate, 75% rate it as inadequate.

All KYTC-Other interviewees rate the level of communication between KYTC and Utility Company as adequate.

From all Consultant-Utilities interviewees, 50% rate the level of communication between KYTC and Utility Company as adequate, and 50% rate it inadequate

From all Consultant-Design interviewees, 50% rate the level of communication between KYTC and Utility Company as adequate, and 50% rate it inadequate

All other interviewees rate the level of communication between KYTC and Utility Company as inadequate.

8. Rank the following (enter the item with the highest impact first) issues according to their impact on timely utility relocation (priority ranking)

30.19% of all interviewees think Right-Of-Way issues have the most impact while 23.19% believe Long Lead Items,26.2% think Utility Company Workload and 20% believe Poor Communication have the highest impact on timely utility relocation.

33% of all KYTC-Utilities interviewees think Right-Of-Way issues have the most impact while 25% believe Long Lead Items,25% think Utility Company Workload and 16% believe Poor Communication have the highest impact on timely utility relocation.

26% of all KYTC-Design interviewees think Right-Of-Way issues have the most impact while 24% believe Long Lead Items,28% think Utility Company Workload and 22% believe Poor Communication have the highest impact on timely utility relocation.

19% of all KYTC-Other interviewees think Right-Of-Way issues have the most impact while 33% believe Long Lead Items,30% think Utility Company Workload and 19% believe Poor Communication have the highest impact on timely utility relocation.

33% of all Consultant-Utilities interviewees think Right-Of-Way issues have the most impact while 13% believe Long Lead Items,28% think Utility Company Workload and 26% believe Poor Communication have the highest impact on timely utility relocation.

25% of all Consultant-Design interviewees think Right-Of-Way issues have the most impact while 25% believe Long Lead Items,25% think Utility Company Workload and 25% believe Poor Communication have the highest impact on timely utility relocation.

33% of other interviewees think Right-Of-Way issues have the most impact while nobody believes Long Lead Items,30% think Utility Company Workload and 37% believe Poor Communication have the highest impact on timely utility relocation.

9. Rank the following practices as to their ability to expedite utility relocation (enter the most impactful practice first). (Priority Ranking)

23% of all interviewees think Strategic use of SUE is the most impactful practice to expedite utility relocation while 21% believe Utility Corridors,26.2% think Early utility involvement and 23.55% believe Pay non-reimbursable utilities are the most impactful practices to expedite utility relocation.

24% of all KYTC-Utilities interviewees think Strategic use of SUE is the most impactful practice to expedite utility relocation while 19% believe Utility Corridors,33% think Early utility involvement and 24% believe Pay non-reimbursable utilities are the most impactful practices to expedite utility relocation

20% of all KYTC-Design interviewees think Strategic use of SUE is the most impactful practice to expedite utility relocation while 27% believe Utility Corridors,31% think Early utility involvement and 21% believe Pay non-reimbursable utilities are the most impactful practices to expedite utility relocation.

21% of all KYTC-Other interviewees think Strategic use of SUE is the most impactful practice to expedite utility relocation while 29% believe Utility Corridors,26% think Early utility involvement and 24% believe Pay non-reimbursable utilities are the most impactful practices to expedite utility relocation.

28% of all Consultant-Utilities interviewees think Strategic use of SUE is the most impactful practice to expedite utility relocation while 11% believe Utility Corridors,33% think Early utility involvement and 28% believe Pay non-reimbursable utilities are the most impactful practices to expedite utility relocation.

22% of all Consultant-Design interviewees think Strategic use of SUE is the most impactful practice to expedite utility relocation while 26% believe Utility Corridors,29% think Early utility involvement and 22% believe Pay non-reimbursable utilities are the most impactful practices to expedite utility relocation.

10. Rank the following technologies as to their ability to expedite utility relocation (enter the most impactful practice first). (Priority Ranking)

28% of all interviewees think GIS/Utility Management System is the most impactful practice to expedite utility relocation while 21% believe RFID MARKING(Marker Balls),27% think 3D CADD and Visualization of Utilities and 24% believe Utility Impact Matrix(classifies Severity by project characteristics) are the most impactful practices to expedite utility relocation.

29% of all KYTC-Utilities interviewees think GIS/Utility Management System is the most impactful practice to expedite utility relocation while 21% believe RFID MARKING(Marker Balls),26% think 3D CADD and Visualization of Utilities and 24% believe Utility Impact Matrix(classifies Severity by project characteristics) are the most impactful practices to expedite utility relocation.

28% of all KYTC-Design interviewees think GIS/Utility Management System is the most impactful practice to expedite utility relocation while 23% believe RFID MARKING(Marker Balls),26% think 3D CADD and Visualization of Utilities and 23% believe Utility Impact Matrix(classifies Severity by project characteristics) are the most impactful practices to expedite utility relocation.

28% of all KYTC-Other interviewees think GIS/Utility Management System is the most impactful practice to expedite utility relocation while 24% believe RFID MARKING(Marker Balls),24% think 3D CADD and Visualization of Utilities and 24% believe Utility Impact Matrix(classifies Severity by project characteristics) are the most impactful practices to expedite utility relocation.

19% of all Consultant-Utilities interviewees think GIS/Utility Management System is the most impactful practice to expedite utility relocation while 13% believe RFID MARKING(Marker Balls),34% think 3D CADD and Visualization of Utilities and 34% believe Utility Impact Matrix(classifies Severity by project characteristics) are the most impactful practices to expedite utility relocation.

29% of all Consultant-Design interviewees think GIS/Utility Management System is the most impactful practice to expedite utility relocation while 24% believe RFID MARKING(Marker Balls),24% think 3D CADD and Visualization of Utilities and 24% believe Utility Impact Matrix(classifies Severity by project characteristics) are the most impactful practices to expedite utility relocation.

11. What level of understanding do you think construction personnel has related to the utility relocation process?

From all interviewees 16% believe construction personnel has strong understanding related to the utility relocation process, 36% think they have neutral understanding, 36% believe they have weak understanding and 12% of them think construction personnel has very weak understanding related to the utility process.

From all KYTC-Utilities interviewees 7% believe construction personnel has strong understanding related to the utility relocation process, 36% think they have neutral understanding, 43% believe they have weak understanding and 14% of them think construction personnel has very weak understanding related to the utility process

From all KYTC-Design interviewees 25% believe construction personnel has strong understanding related to the utility relocation process, 50% think they have neutral understanding, 25% believe they have weak understanding related to the utility process

From all KYTC-Other interviewees 50 believe construction personnel has weak understanding related to the utility relocation process, and 50% of them think construction personnel has very weak understanding related to the utility process

From all Consultant-Utilities interviewees 50% believe construction personnel has neutral understanding related to the utility relocation process and 50% of them think construction personnel has weak understanding related to the utility process

From all KYTC-Design interviewees 50% believe construction personnel has strong understanding related to the utility relocation process, and 50% of them think construction personnel has neutral understanding related to the utility process

All other interviewees (100%) believe construction personnel has strong understanding related to the utility relocation process.

12. What level of understanding do you think design personnel has related to the utility relocation process?

From all interviewees 32% believe design personnel has strong understanding related to the utility relocation process, 24% think they have neutral understanding, 32% believe they have weak understanding and 12% of them think design personnel has very weak understanding related to the utility relocation process.

From all KYTC-Utilities interviewees 27% believe design personnel has strong understanding related to the utility relocation process, 27% think they have neutral understanding, 40% believe they have weak understanding and 7% of them think design personnel has very weak understanding related to the utility relocation process.

From all KYTC-Design interviewees 33% believe design personnel has strong understanding related to the utility relocation process, 33% think they have neutral understanding, and 33% of them think design personnel has weak understanding related to the utility relocation process.

From all KYTC-Other interviewees 50% believe design personnel has strong understanding related to the utility relocation process, and 50% of them think design personnel has very weak understanding related to the utility relocation process.

From all Consultant-Utilities interviewees 50% believe design personnel has strong understanding related to the utility relocation process and 50% of them think design personnel has weak understanding related to the utility relocation process.

From all Consultant-Design interviewees 50% believe design personnel has strong understanding related to the utility relocation process and 50% of them think design personnel has very weak understanding related to the utility relocation process.

All other interviewees believe design personnel have neutral understanding related to the utility relocation process.

13. What level of understanding do you think utility company personnel has related to the KYTC project management process?

From all interviewees 4% believe utility company personnel has very strong understanding related to the KYTC project management process, 16% think they have strong understanding, 16% think they have neutral understanding, 48% believe they have weak understanding and 16% of them think utility company personnel has very weak understanding related to the KYTC project management process.

From all KYTC-Utilities interviewees 14% believe utility company personnel has strong understanding related to the KYTC project management process, 14% think they have neutral understanding, 57% believe they have weak understanding and 14% of them think utility company personnel has very weak understanding related to the KYTC project management process.

Appendix C: National Synthesis— State Department of Transportation Survey Questionnaire

NCHRP Topic 47-14 State Transportation Agency Survey Questionnaire
November 2015

Synthesis 47-14 seeks to determine how previous research has been incorporated into current practice and compile information about how State Transportation Agencies (STAs) and utility stakeholders are scoping, conducting, and managing effective utility coordination. Additional information will be collected on factors including:

Identification of the core elements of effective utility coordination;
Current practices to manage consultant-led utility coordination, both stand alone and those incorporated into design contracts;
Current practices to perform utility coordination in-house;
How and when stakeholders are integrated into the utility coordination process (e.g. design team, contractors, utility owners, consultants, resource agencies, etc.);
Pre-qualification requirements for consultants and evaluation measures of performance;
Training and certification available and/or required for utility stakeholders;
How academic programs are educating students about utility engineering;
The process by which an effective utility coordination project is scoped (e.g. project schedule, type and complexity of project, level of effort, level of risk, etc.);
Gaps in knowledge and research;
Examples of inconsistencies between legislation, regulations, guidance, and practice.

Pilot tests indicated an average time of [X] minutes to complete the survey.

Please complete the online questionnaire by [date]. If you have questions or would prefer to complete a paper copy questionnaire, please contact:

Roy Sturgill	Email: roy.sturgill@uky.edu	Phone (859) 218-0119

Please identify your contact information. NCHRP will email you a link to the online report when it is completed.

Agency:

Address:

City: ______________________________ State: __________ ZIP:

Questionnaire Contact:

Position/Title:

In case of questions and for NCHRP to send you a link to the final report, please provide:

Tel: ________________ Email:

General Utility Coordination Process Information

Does your agency use documented procedures (manual of instructions, policy and/or guidance manual) for utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

☐Yes ☐No

Would you be willing to participate in a follow-up phone interview?

☐Yes ☐No

Please rank the statements below that **best** describes your STA's **typical approach** to the utility coordination process? (1 being the most applicable term, 3 being the least applicable term)

_____ Proactive (try to anticipate needs and accomplish them prior to realization)

_____ Reactive (wait until needs are realized and then start to address them)

_____ Interactive (work collaboratively with project teams in the creation and addressing of needs)

Comments: 46T

Please rate the effectiveness of your utility relocation process in **EACH** of the following areas (**RATE** each of the areas according to the following scale: 5-"Not Effective", 4-"Somewhat Effective", 3-"Effective", 2-"Very Effective", 1-"Extremely Effective").

_____ Timely Utility Involvement on the Project

_____ Utility Coordination Communication

_____ Utility Relocation/Alignment is considered within Design Decisions

_____ Minimized Utility Relocation Costs

_____ Timely Utility Relocations

Please provide a short statement of support for your ratings in Question 4. For example, a STA may respond that they have Effective Utility Coordination practices on the basis that utility relocations are rarely impactful of lettings or project construction and they are involved early and work collaboratively as part of the project development team.

46T

Has your agency performed any analysis of the effectiveness (in terms of the amount of utility delays during construction, percent of relocations complete prior to letting, or letting delays due to utilities) of your procedures for utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

☐Yes ☐No ☐Unsure

In your STA, what best describes the location of the business unit responsible for utility coordination?

☐Division of Design

☐Division of Right-of-Way

☐Division of Permitting

☐Division of Maintenance/Operations

☐Division of Utilities

☐Other 46T

Stemming from Question 7, is the utility coordination business unit organized differently at the regional/district level versus the central/statewide level?

☐Yes ☐No

To expound upon your response in Question 7 and 8, please provide a short statement regarding utility coordination within the agency. We would like to know who is responsible for utility coordination at a project level (one utility coordinator, project managers, a team of utility coordinators, or consultants), and if utility coordination responsibilities change within the project, for instance some states handle utility coordination with a centralized utility coordinator within design but it becomes the district construction manager's responsibility during construction.

46T

What **core** elements would you consider the most vital for an effective utility coordination process? (Please select up to your **top 8 choices**)

☐Defined Procedures (i.e., Utility Coordination Guidance Manual)

☐Early Utility Involvement in Design (30% or earlier)

☐Utility Mapping System (utility location information entered into a GIS based system)

☐Use of Utility Corridors

☐Future Use ROW Acquisition

☐Use of SUE (Subsurface Utility Engineering)

☐Use of Standardized Utility Agreements

☐ Pay for Relocations that are Traditionally Non-reimbursable

☐Identify and plan for long-lead items

☐ Communication of Long-Range Transportation Plan

☐ Communication of Short-Range Transportation Plan

☐ Regularly Scheduled Meetings with Utility Owners

☐Training Program for Design Engineers on Utility Coordination

☐Utility Conflict Matrix Tracking System

☐Documented Guidance on Utility Conflict Resolution Methods (by type of conflict)

☐Utility Preconstruction Meetings

☐Programmatic/System Collaborative Planning with Utilities (matching utility infrastructure plans to long-term highway plans)

☐Process for Utility Risk Management

☐ Considerations of Costs and Reimbursements for Design/Construction versus Utility Relocations

☐Consideration of Utilities Relocation Schedules in relation to Project Schedules

☐Uses of Advanced Utility Location/Marking Technologies (Marker Balls, etc)

☐Process for Safety Mitigation in Utility Coordination

☐Other 46T

At what point in project development/design, does the utility coordination process typically begin? (Select the best answer relative to your STA)

☐During Planning

☐10% Project Design Complete

☐30% Project Design Complete

☐60% Project Design Complete

☐90% Project Design Complete

Comments: 46T

When do particular project stakeholders become involved in your utility coordination process (as a percent of the utility coordination and relocation process—the process being considered is from identified potential conflicts through the relocation of affected utilities)?

Project Design Managers ☐Start ☐10% ☐30% ☐60% ☐90%

Project Design Consultants ☐Start ☐10% ☐30% ☐60% ☐90%

Location Services ☐Start ☐10% ☐30% ☐60% ☐90%

ROW Agents/Managers ☐Start ☐10% ☐30% ☐60% ☐90%

Utility Owners ☐Start ☐10% ☐30% ☐60% ☐90%

Utility Contractors ☐Start ☐10% ☐30% ☐60% ☐90%

Utility Designers ☐Start ☐10% ☐30% ☐60% ☐90%

Other 46T ☐Start ☐10% ☐30% ☐60% ☐90%

What has been your STA's level of implementation of the following SHRP2 Utility Focused practices?

SHRP2 R01A: 3D Utility Location Data Repository ~ technologies that support, store, retrieve, and use 3D utility location data

☐None ☐ Little ☐Some ☐Complete ☐Not Sure

SHRP2 R01B: 3D Utility Investigation Technologies ~ the advanced application of SUE through combining multiple technologies (multi-channel ground penetrating radar, time domain electromagnetic induction, etc.) based on soil type, utility material, terrain type, and other features

☐None ☐ Little ☐Some ☐Complete ☐Not Sure

SHRP2 R15B: Identifying and Managing Utility Conflicts ~ the development and use of a utility conflict matrix and database system to manage utility conflicts throughout the design and construction

☐None ☐ Little ☐Some ☐Complete ☐Not Sure

Comments (please add comments, especially if you incorporated these practices prior to the SHRP2 projects, or if you are a pilot state for any of the above): 46T

Is a single point of contact used to conduct and manage the utility coordination process (i.e. you attempt to have a single project utility coordinator for the life of the project)?

☐Yes ☐No

In regard to Questions 14, please expound as to how the utility coordination is managed.

46T

Does your STA have a process for setting the scope (utility relocation/coordination, project schedule/durations, and cost estimate) required for a project's utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

☐Yes ☐No

Please rank order the factors considered in scoping an individual project's utility coordination. (1 being the top consideration and 9 being the least important)

_______ Project Schedule

_______ Number of Utilities Involved

_______ Type of Utilities Involved

_______ Number of ROW Parcels Involved

_______ ROW Parcels Type (Residential, Commercial, Urban, Rural, etc.)

_______ Project Classification (New Route, Road Widening, Resurfacing, etc.)

_______ Location Classification (Urban versus Rural)

_______ Level of Coordination Effort

_______ Level of Utility Risk

What utility coordination practices are used by your STA? (**Please check all that apply**; include practices that you use in a limited fashion or even as a trial. Many of these are not appropriate for use on every project.)

☐Defined Procedures (i.e., Utility Coordination Guidance Manual)

☐Early Utility Involvement in Design (30% or earlier)

☐Utility Mapping System (utility location information entered into a GIS based system)

☐Use of Utility Corridors

☐Future Use ROW Acquisition

☐Use of SUE (Subsurface Utility Engineering)

☐Use of Standardized Utility Agreements

☐ Pay for Relocations that are Traditionally Non-reimbursable

☐Identify and plan for long-lead items

☐ Communication of Long-Range Transportation Plan

☐ Communication of Short-Range Transportation Plan

☐ Regularly Scheduled Meetings with Utility Owners

☐Training Program for Design Engineers on Utility Coordination

☐Utility Conflict Matrix Tracking System

☐Documented Guidance on Utility Conflict Resolution Methods (by type of conflict)

☐Utility Preconstruction Meetings

☐Programmatic/System Collaborative Planning with Utilities (matching utility infrastructure plans to long-term highway plans)

☐Process for Utility Risk Management

☐ Considerations of Costs and Reimbursements for Design/Construction versus Utility Relocations

☐Consideration of Utilities Relocation Schedules in relation to Project Schedules

☐Uses of Advanced Utility Location/Marking Technologies (Marker Balls, etc)

☐Process for Safety Mitigation in Utility Coordination

☐Other 46T

☐Other 46T

Rate utility coordination involved with alternative contract procurement methods (design-build, P3, CMGC) in comparison to utility coordination on design-bid-build projects.

☐Better ☐Same ☐Worse ☐Not Applicable

In regard to Questions 19, please expound as to how the utility coordination is affected by alternative procurement methods.

46T

Practices Related to Consultant-led Utility Coordination

Does your STA use consultant-led utility coordination (either as part of a stand-alone utility consultant agreement or a project design consultant agreement? (If no, skip to the next section of questions)

☐Yes ☐No

Please categorize your contracts associated with consultant-led coordination.

☐Stand-alone ☐Part of a Project Design Consultant Agreement ☐Both

If you use a stand-alone utility consultant agreement, how would you rate consultant-led utility coordination relative to in-house?

☐Better ☐Same ☐Worse ☐Not Applicable

Comments: 46T

If the utility coordination is part of a project design consultant agreement, how would you rate consultant-led utility coordination relative to in-house?

☐Better ☐Same ☐Worse ☐Not Applicable

Comments: 46T

Does your agency require pre-qualifications (including qualification as part of the consultant solicitation) for consultant-led utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

☐Yes ☐No

Does your agency evaluate performance in consultant-led utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

☐Yes ☐No

How does the STA manage the consultant-led utility coordination? (Select the best answer relative to your STA)

☐Central/Statewide Oversight

☐Local Coordinator Oversight

☐Local Design Team Oversight

☐Other 46T______________________________

Why does your STA use consultant-led utility coordination? (Select the best answer relative to your STA)

☐Limited Number of STA In-house Staff

☐Lack of STA In-house Expertise

☐Complexity of Design

☐Complexity of Utilities Involved

☐Scope/size of project

☐Other 46T

Utility Coordination Certification, Training, and Education Questions

Does your STA make available and/or require any certification or training for utility coordination? (If no, skip to the next section of questions) (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

☐Yes ☐No

Comments: 46T

What stakeholder groups are offered training in utility coordination by your STA? (Select all that apply.)

☐In-house Utility Coordination Staff

☐ In-house Design Staff

☐ In-house Construction Staff

☐Stand-along Utility Coordination Consultants

☐Design Consultants Conducting Utility Coordination

☐Other 46T

☐Other 46T

Do any universities/trade programs/technical colleges offer utility coordination curriculum within your state?

☐Yes ☐No ☐Unsure

Utility Related Legislation, Regulations, and Guidance Questions

Do you find there are inconsistencies in state or federal legislation or regulations causing utility coordination issues? (If no or unsure, skip the next question)

☐Yes ☐No ☐Unsure

If the response to Questions 32 is yes, please give a brief description below so we can further research the inconsistencies.

46T

Do you find there are guidance (STA guidance manuals, Federal guidance, etc.) related inconsistencies causing utility coordination issues? (If no, skip the next question)

☐Yes ☐No

If the response to Questions 34 is yes, please give a brief description below so we can further research the inconsistencies.

46T

Future Opportunities

Which areas seem to be of most need relative to the future of the utility engineering field? (Select your **top 3**).

☐Location Technologies

☐Standard Coordination Procedures

☐Updated Legislation and Regulations

☐Standardized Relocation Cost Rates (Predetermined Schedule of Costs)

☐Improved Understanding of SUE

☐Other 46T

☐Other 46T

What knowledge gaps (areas for future technology, current legislation needs, etc.) do you see in the field of utility coordination?

46T

Follow-up Documentation

Questions 1 asked, “Does your agency use documented procedures (manual of instructions, policy and/or guidance manual) for utility coordination?” If you responded yes, please attach any documentation (or relevant tools) in the form of text, web link(s), file(s), or contact information to make a request for the information below.

46T

Questions 6 asked, “Has your agency performed any analysis of the effectiveness (in terms of the amount of utility delays during construction, percent of relocations complete prior to letting, or letting delays due to utilities) of your procedures for utility coordination? “ If you responded yes, please attach any associated documentation of the analysis in the form of text, web link(s), file(s), or contact information to make a request for the information below.

46T

Questions 16 asked, “Does your STA have a process for setting the scope (utility relocation/coordination, project schedule/durations, and cost estimate) required for a project’s utility coordination?” If you responded yes, please attach any documentation in the form of text, web link(s), file(s), or contact information to make a request for the information below.

46T

Questions 25 asked, “Does your agency require pre-qualifications (including qualification as part of the consultant solicitation) for consultant-led utility coordination? “ If you responded yes, please attach any documentation below on the types of pre-qualifications required in the form of text, web link(s), file(s), or contact information to make a request for the information.

46T

Questions 26 asked, “Does your agency evaluate performance in consultant-led utility coordination?” If you responded yes, please attach any documentation in the form of text, web link(s), file(s), or contact information to make a request for the information below.

46T

Questions 29 asked, “Does your STA make available and/or require any certification or training for utility coordination?” If you responded yes, please attach any documentation in the form of text, web link(s), file(s), or contact information to make a request for the information below.

46T

The survey is complete. Thank you for your participation!

Appendix D: National Synthesis—Redacted Summary of Results

Please rank the statements below that best describes your STA's typical approach to the utility coordination process? (1 being the most applicable term, 3 being the least applicable term)

Rank	Item	Distribution	Score	No. of Rankings
1	Interactive (work collaboratively with project teams in the creation and addressing of needs)		75	31
2	Proactive (try to anticipate needs and accomplish them prior to realization)		53	25
3	Reactive (wait until needs are realized and then start to address them)		48	32

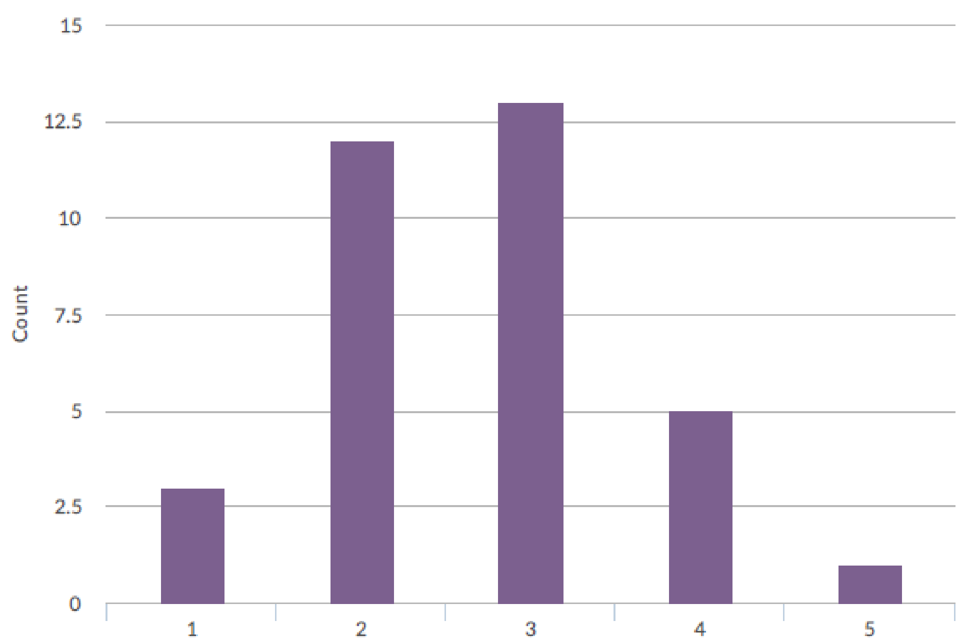
Lowest Rank Highest Rank

Please rank the statements below that best describes your STA's typical approach to the utility coordination process? (1 being the most applicable term, 3 being the least applicable term) - comments

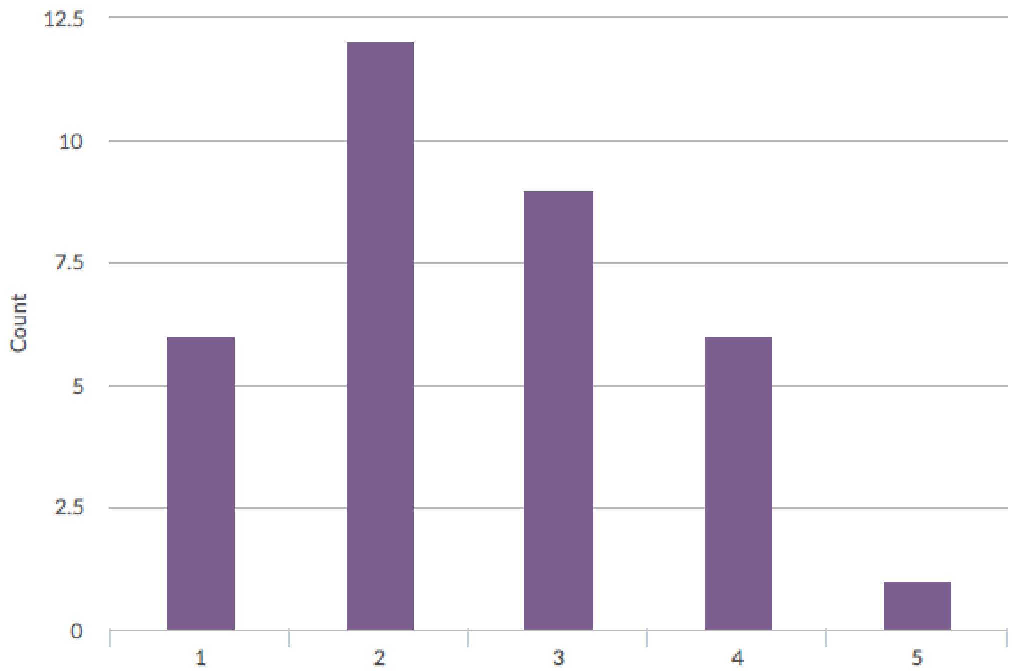
Count	Response
1	Early and often is a key phrase that is often used when dealing with Utilities
1	Sometimes we are proactive, but far too often we are reactive. With utilities at the end of the plan process, promises are made and nearly all of the hurdles have been cleared so projects are not often delayed if the utility work is not completed.
1	We meet quarterly with most utilities and discuss projects both by agency and utility's projected work load.
1	With the help of new staff, my unit is currently evaluating how better address utilities during design.

Please rate the effectiveness of your utility relocation process in EACH of the following areas (RATE each of the areas according to the following scale: 1-"Extremely Effective", 2-"Very Effective", 3-"Effective", 4-"Somewhat Effective", 5-"Not Effective").

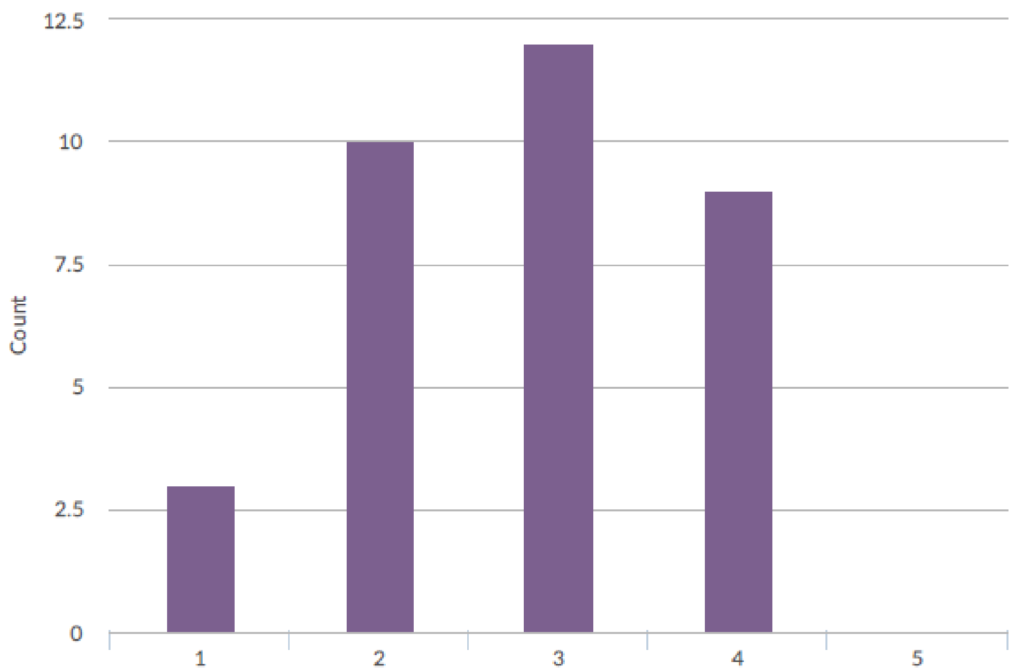
Timely Utility Involvement on the Project



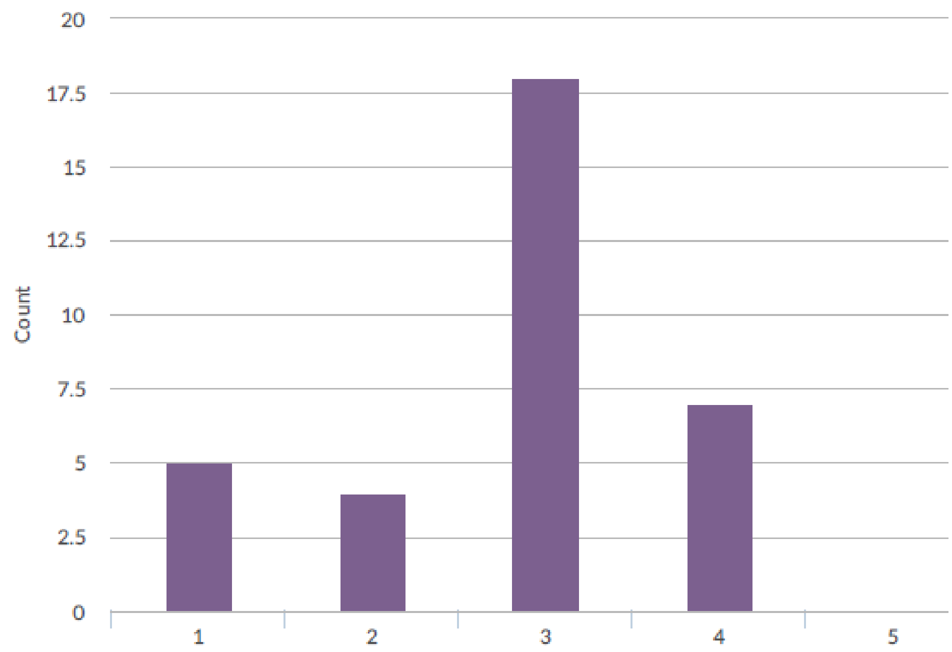
Utility Coordination Communication



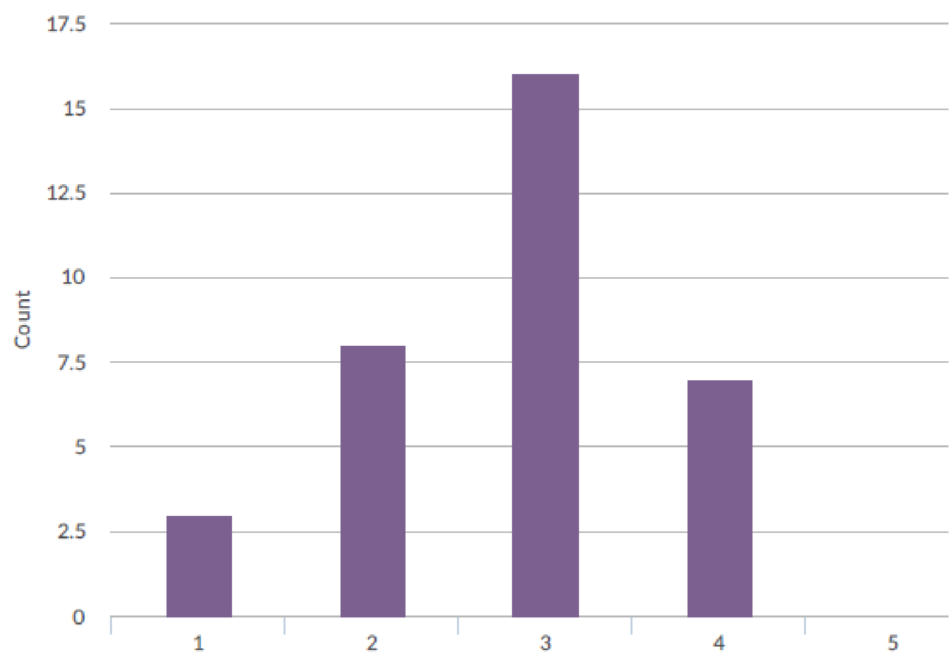
Utility Relocation/Alignment is considered within Design Decisions



Minimized Utility Relocation Costs



Timely Utility Relocations



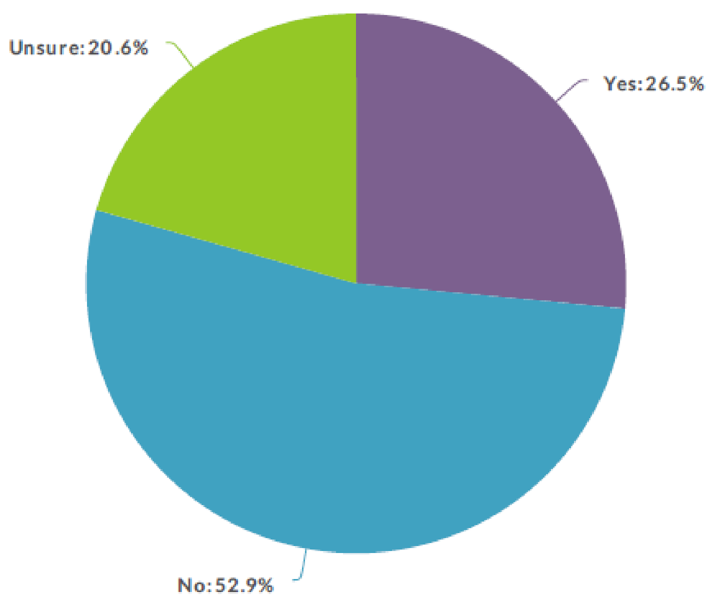
Please provide a short statement of support for your ratings in Question 4. For example, a STA may respond that they have Effective Utility Coordination practices on the basis that utility relocations are rarely impactful of lettings or project construction and they are involved early and work collaboratively as part of the project development team.

Count	Response
1	At HQ we train Utility Coordinators on the process. It is up to each District to effectively manage each utility conflict.
1	In regards to utility involvement, we reach out to the companies at either concept or survey plans to start coordination and obtaining information, but companies do not seem to get serious about their relocation designs until late in the DOT design process or even later. We seem to be effective at getting involvement from companies though we would like it to be better. In regards to coordination communication, we try to get all necessary information to and from utility companies throughout project design. We try to point out any potential areas of concern and conflict for consideration to both highway design and utility companies. We are constantly going back and forth between parties to work out location of facilities, necessary relocations and designs, timing and any other needs. We also hold monthly meetings with design, construction and utility companies to discuss various projects. Our existing process seems to be effective. In regards to utility relo/align being considered
1	Intensive collaboration with utilities and project stakeholders and pro-active in providing assistance and training. Utility coordination is a Department wide Business Plan initiative
1	Large region geographically, but limited number of Utilities so we know them well and communicate closely.
1	Missouri DOT has dedicated utility staff in each district to coordinate all the utility relocations. This positions is highly effective in getting the utilities completed prior to the project letting or coordinated into the project.
1	One of the major elements of the Project is the Utility coordination. Therefore, it is critically important to treat the utility as a partner and get them involve during the early design phase of the project.
1	Our utility coordination process stresses early involvement of the utilities. The process success is highly dependent upon the project managers' involvement and we have been seeing variable results.
1	PennDOT's utility relocation process is very effective during design but is less effective during construction because it's not managed the same way.
1	Reimbursement under CH86 as incentive for the relocation of existing utilities on public ROW is well received and instrumental in including utility relocations in the state highway contract.
1	Some utility companies within the State are more responsive then others.

Count	Response
1	Test
1	The MDOT attempts to minimize utility impacts to projects at the same time it tries to minimize project impacts to Utilities. Our success varies by level of experience within the utility and MDOT.
1	The NCDOT has developed an early coordination program in handling utility relocation issues. As our program expands in using this new methodology in handling utility conflicts, our effectiveness should greatly improve our efforts in coordinating with the internal (DOT) and external customers (Utilities).
1	The NDDOT creates Utility Conflict plans which include the approximate locations of the utilities shown on the cross sections.
1	The process of utility relocation is as effective as the system in place at the STA allows. The utilities are slow to respond to locate requests and will drag engineering out for relocation work. I personally have tried to notify utilities early in the process to have them aware of the work and to allow them to plan in advance with knowledge of upcoming work. This only produced marginal improvement in utility design and relocation time over waiting until the roadway design was completed to notify utilities of an upcoming project and conflicts that need to be addressed.
1	The utilities are very interested in "not being the delay" on a major construction project. Our utilities typically are stakeholders and consider themselves part of the project. This approach is much more successful with local utilities. Those that exist in multiple states try to be proactive within their company rules. Utility impacts and avoidance is a new concept for our designers, but once understood, the coordination is much better.
1	The utilities have their own rules and consider us to be a "bother." We try but the effort is never easy.
1	There will always be projects that come to Utilities late and to process these projects for conflicts takes time. Utility relocations in urban settings are suggested to be put into the construction plans to avoid delays. The plans from the cities or their consultants are incorporated into our letting plans. Utility relocation is also dependent upon the availability of material for the projects. Project scheduling is sometimes set up so that the most intense coordination efforts are late making tasks listed challenging to complete and value diminishes.
1	Unless the relocation cost is very expensive, not much consideration is given to changing the roadway design.
1	Utilities are involved at the Concept stage through letting. Most projects have relocations complete before the letting.
1	Utilities are not considered in the preliminary design by project development. Designers seldom design around utilities. Occasionally, design will change late in the process to try and avoid a costly relocation.
1	Utility Coordination is normally extremely effective when done early and continuously. Due to complexities and the number of individuals involved, the effectiveness can be compromised when one link breaks down. This is most commonly when designers do not receive utility information early enough in design, when utility owners are slow or non-responsive at any stage of the project, and when STA's contractors communication breaks down in the field.
1	Utility Coordination is timely and re-location alignment and costs are considered during design but timely relocations are often at the mercy of the utility companies.
1	Washington State has 6 Regions and though the process may vary slightly from Region to Region. Washington State over the years has moved toward consideration of designing around the Utility when possible. Where if the relocation is a Utility cost, they would pay for the any added cost to design around their facility. In most case the Utility is brought on board early in the design phase.
1	We are very proactive in Design and incorporate SUE work with determining exactly where the utility is in the design phase
1	We communicate early with the utilities, however, they are still slow to relocate in a timely manner

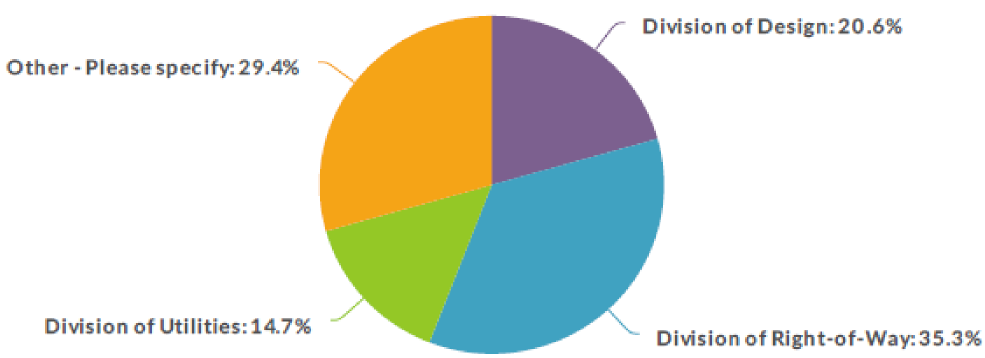
Count	Response
1	We have improved our utility relocation procedures for more advanced coordination with utilities and design and this has resulted in keeping utilities on schedule.
1	We try to start in design phase coordinating our utility concerns. For the most part we are waiting on the companies to act. We do have good record of accomplishing timely utility relocations. Very seldom are our letting dates compromised.
1	We work collaboratively with the utility companies to coordinate relocation prior to construction if at all possible.
1	WisDOT has statutory, administrative rules, and policies that require utility involvement and this in turn requires communication with utility companies. WisDOT designers are also required to try and design around utilities when in best interest of tax/rate payers, but this does not happen as often as it should which in turn increases utility relocation costs. Finally, utility relocations are timely due to administrative rules.
1	With the help of new staff, my unit is currently evaluating how better address utilities during design.
1	Would prefer earlier and more interactive involvement during road project development to raise ratings

Has your agency performed any analysis of the effectiveness (in terms of the amount of utility delays during construction, percent of relocations complete prior to letting, or letting delays due to utilities) of your procedures for utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)



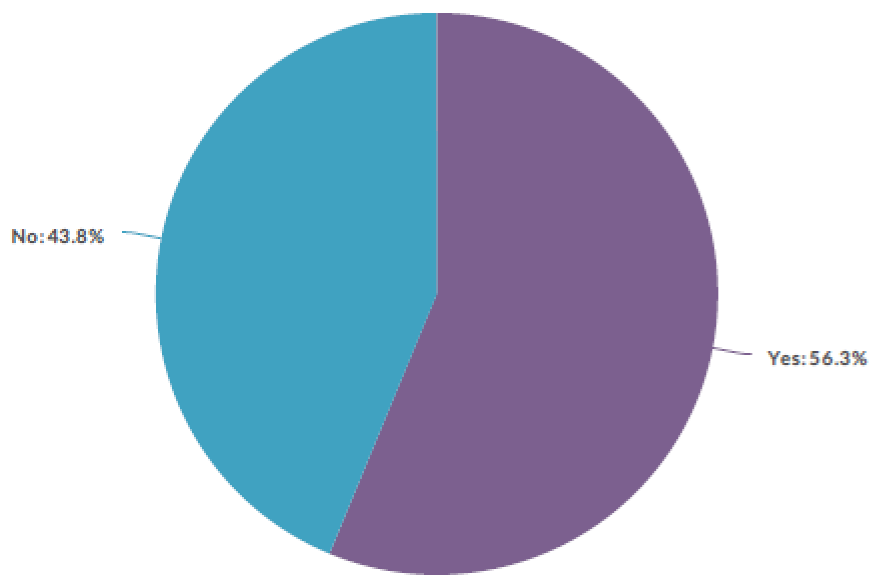
Value	Percent		Count
Yes	26.5%		9
No	52.9%		18
Unsure	20.6%		7
		Total	34

In your STA, what best describes the location of the business unit responsible for utility coordination?



Value	Percent		Count
Division of Design	20.6%		7
Division of Right-of-Way	35.3%		12
Division of Utilities	14.7%		5
Other - Please specify (click to view)	29.4%		10
		Total	34

Stemming from Question 7, is the utility coordination business unit organized differently at the regional/district level versus the central/statewide level?



Value	Percent		Count
Yes	56.3%		18
No	43.8%		14
		Total	32

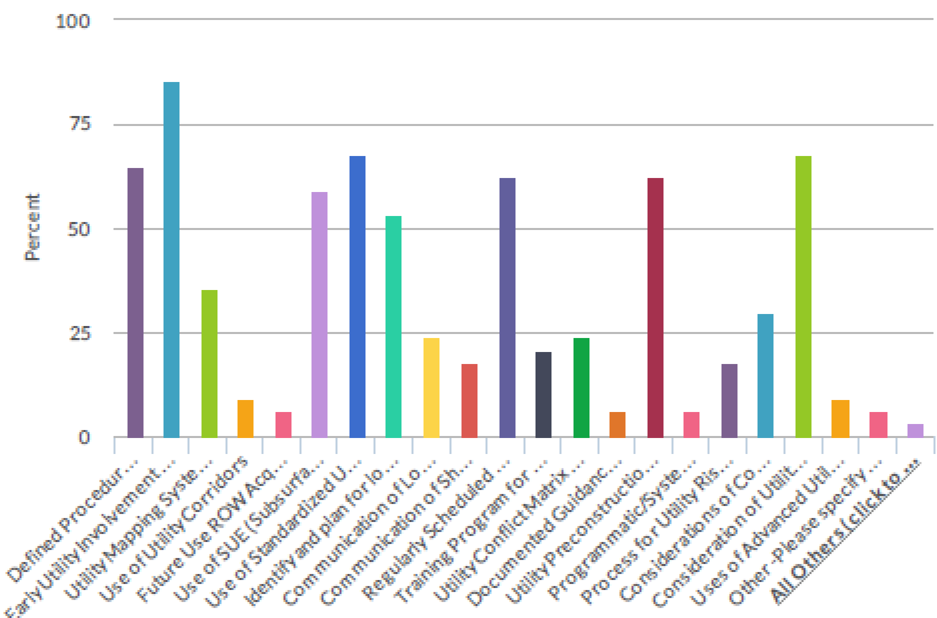
To expound upon your response in Question 7 and 8, please provide a short statement regarding utility coordination within the agency. We would like to know who is responsible for utility coordination at a project level (one utility coordinator, project managers, a team of utility coordinators, or consultants), and if utility coordination responsibilities change within the project, for instance some states handle utility coordination with a centralized utility coordinator within design but it becomes the district construction manager's responsibility during construction.

Count	Response
1	At a project level UDOT has a single point of contact at the Region level located in the Pre-construction unit (design). This individual does coordination up through award of contract. Once UDOT's contractor is in place, the primary role of coordination shifts to the Resident Engineer (construction). The single point of contact is still available for issue escalation/resolution. The contact does not change for an individual project. UDOT has several staff who manage coordination and uses consultant resources to supplement staff. When using consultants, UDOT has a designated coordinator to direct the work, maintain relationships with the utility owners, make project decisions, and sign letters and agreements.
1	Central utility coordination one coordinator working with a design utility coordinator in a large team. Support goes through utility relocation and project construction.
1	Centralized management of right of way and utilities coordination activities provide for consistent application of policies and procedures and effective oversight
1	DelDOT is organized such that the Utilities Section reports to the Chief of Right-of-Way but the division we are part of handles design, ROW, construction along with other things. Utility coordination is centralized at DelDOT as is our construction management/oversight team. Our Districts are part of the Maintenance Division and are not involved in DOT projects. They only oversee utility permitting along with types of permits and maintenance related activities. In our central office, utility coordinators are assigned specific projects early in design (concept or survey phase). The coordination responsibilities stay with the assigned coordinator until project construction is complete. Internal personnel associated with project design and construction management also provide input/assistance in our coordination process. When consultants are used for design, coordination efforts may be the consultant's responsibility with oversight by an assigned in-house utility coordinator. This is de
1	District handles project util coord. Central office provides support and executes most fiscal matters
1	During design phase the Utilities Section Engineer conducts utility coordination. During the Construction phase the District Utility Coordinator handles utility oversight for the project.
1	Each District has a Utility Relocation Administrator that coordinates utility relocations during design. There are seperated Construction Managers in each District that coordinate utility relocations during construction.
1	Each of MoDOT's 7 districts has at least 1 District Utility Engineer that handles all the utility coordination. At the statewide level we have a utility coordinator that provides consistency among the districts and handles the more complex questions that arise.
1	Each of our Districts have a utility coordinator who answers to the Project Development Branch. We are decentralized yet our Central Office has oversight.

Count	Response
1	I am the Utility Program Manager that assists the Regions. In each Region is there is Region Utility Engineer that coordinates with the Project Engineers for each project.
1	It is up to each District to organize the Utility Section. Typically the Utility Section is under the Division of Right of Way. HQ R/W encourages Districts to work closely with a Utility Engineering Workgroup. The effectiveness between Utilities and UEW varies by District.
1	MDOT has divided the state into 6 different districts (1,2,3,5,6, & 7). Each district has at least one utility coordinator. District 6 uses four utility coordinators. Each utility coordinator has a geographic area within the district that we cover. We are responsible for each utility relocation project from the initial investigation of utilities within the project limits (for design and planning purposes) to the final completion of the relocation of utilities in conflict. The utility coordinator processes all paperwork for the relocation and is the point of contact between MDOT, utility owners, and engineers. We submit agreements and invoices to the utility section of right of way division in our central office for Transportation Commission approval, funding, and payments.
1	On a project level utility coordination is handled by the Regional Utility Engineer and the Project Designer. The Main Office Utility section interprets and disseminates policy, answers questions, maintains a database and processes utility agreements for the Regions.
1	Procedures, processes, requirements, training, and QA/QC at the Central office with actual coordination happening in the Regions.
1	Project level has 1 District Utility Coordinator (DUC) answerable to the Assistant District Engineer. DUC coordinates with utilities on the projects during design and construction, utility plans are submitted to them. Central Office Staff send out plan submittals, write agreements and answer policy questions.
1	Region utility coordinator daily interact with utilities. Central HQ contracts, audits, and assemble plans for contract.
1	Right of Way approves the design and location but the Contracting Group does the agreements.
1	Statewide Utilities is located in the Office of Construction. District Utilities are located under Project Development.
1	Test
1	The Region Utility Manager is the coordinator for the DOT, with assistance from Central Office as needed. Central Office reviews plans, estimates and agreements and facilitates approval.
1	The Utilities Unit is a centrally located to handle statewide highway let projects. In addition, NCDOT has 14 divisions and each division has a utility coordinator to handle local projects.
1	The utility coordination during design is accomplished in the central office and the utility coordination during construction is accomplished by the districts.
1	Ultimate responsibility is the project managers' but the actual tasks may be delegated to other team members.
1	Utilities if a part of our Office of Real Estate. Each of our 12 districts has a utility coordinator, and 1 utility manager at our central office.
1	Utility Coordinators handle all preconstruction utility relocation activities then provides assistance to the construction engineers during construction.
1	Utility Coordinators work with the designers and project managers to facilitate the relocation of Utility facilities. Utility coordination is centralized.

Count	Response
1	Utility coordination at a project level can be performed in any of the ways described above in Wisconsin. It is all dependent on the skills and abilities of the staff involved.
1	Utility coordination on typical Design/Bid/Build project is a joint effort of the design group and the utility group. On a Design/Build the project office in charge would collect as much data possible form the affected groups to provide to the Design/Builder and continue to work with them through the process.
1	We are de-centralized division.
1	We have two utility sections located in the Right-of-Way division, one for the north and one for the south
1	Within the SouthCoast region, either I or the Asst. Utility Engineer are responsible. Once a utility relocation is signed, the Project engineer on the specific project is responsible for implementing the agreement with our support.
1	utility coordination is started in the central office under project development (notification and research). The resident engineers (project engineers) in the field are responsible for meeting with companies and determining conflicts. Once these meetings take place, the information needs to be sent back to the central office so that relocation agreements can be processed. Once the agreement is in place, the utility company works with the Resident Engineer to schedule the work. The central office handles all payments.

What core elements would you consider the most vital for an effective utility coordination process? (Please select your up to 8 choices)

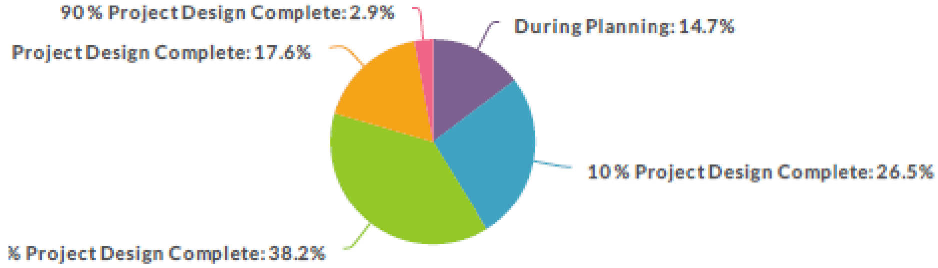


Value	Percent	Count

Value	Percent		Count
Defined Procedures (i.e., Utility Coordination Guidance Manual)	64.7%		22
Early Utility Involvement in Design (30% or earlier)	85.3%		29
Utility Mapping System (utility location information entered into a GIS based system)	35.3%		12
Use of Utility Corridors	8.8%		3
Future Use ROW Acquisition	5.9%		2
Use of SUE (Subsurface Utility Engineering)	58.8%		20
Use of Standardized Utility Agreements	67.6%		23
Identify and plan for long-lead items	52.9%		18
Communication of Long-Range Transportation Plan	23.5%		8
Communication of Short-Range Transportation Plan	17.6%		6
Regularly Scheduled Meetings with Utility Companies	61.8%		21
Training Program for Design Engineers on Utility Coordination	20.6%		7
Utility Conflict Matrix Tracking System	23.5%		8
Documented Guidance on Utility Conflict Resolution Methods (by type of conflict)	5.9%		2
Utility Preconstruction Meetings	61.8%		21
Programmatic/System Collaborative Planning with Utilities (matching utility infrastructure plans to long-term highway plans)	5.9%		2
Process for Utility Risk Management	17.6%		6
Considerations of Costs & Reimbursements for Design/Construction versus Utility Relocations	29.4%		10
Consideration of Utilities Relocation Schedules in relation to Project Schedules	67.6%		23
Uses of Advanced Utility Location/Marking Technologies (Marker Balls, etc)	8.8%		3
Other - Please specify any other vital core elements (click to view)	5.9%		2
All Others (click to expand) ▸	2.9%		1

At what point in project development/design, does the utility coordination process typically begin? (Select the

best answer relative to your STA)



Value	Percent		Count
During Planning	14.7%		5
10% Project Design Complete	26.5%		9
30% Project Design Complete	38.2%		13
60% Project Design Complete	17.6%		6
90% Project Design Complete	2.9%		1
		Total	34

At what point in project development/design, does the utility coordination process typically begin? (Select the best answer relative to your STA) - comments

Count	Response
1	Coordination/communications starts int he planning phases but the real conflicts are communicated after 50 % project design.
1	Earlier involvement the better. Pays in the end to be involved early.

Count	Response
1	In Wisconsin, it has been found that typically the best starting point is at 30% Project Design Complete when the utility staff can see draft plan and profile sheets as this allows them to understand how the project will affect their facilities. On Mega/Major projects, utility involvement would start at about the 10% Project Design Complete due to complexity and lead times required for the relocations.
1	It all depends the severity of the utility impact to the project.
1	MDOT typically tries to include a utility survey with the topographical survey of the project location as part of the field review for the project. The roadway project design is about 30% complete for the field review. The utility survey process has become increasingly difficult due to utilities not responding to location requests for surveys.
1	On large or more complex urban projects, utility involvement may begin earlier.
1	On larger projects, preliminary notification is done at the first plan issuance (10%) -- preliminary plans. Smaller projects get only 1 notification and that varies from 18 months early to 2 months early depending on the project.
1	The NCDOT will scope projects during the planning stage to avoid major utility impacts consisting of long lead times and cost. The NCDOT will identify permanent utility easements (PUE) to be reflected on the hearing maps. The NCDOT will meet with the utility companies at around 25% project design complete with plans reflecting R/W limits, line & grade, slope stakes and utilities. These plans don't contain hydro information. The first meeting with the utility companies take place 12 to 24 months prior to project let dates.
1	This allows for the identification of utility conflicts and planning to reduce the conflicts. Most coordination occurs at final design due to the fact that most utilities will not start designing until they have a final set of plans as to avoid additional revision in the design or stockpiling of unneeded materials.
1	This is typically beginning of monthly coordination. Planning is the beginning of coordination, but is at a very high level and not much detail.
1	We state that it should begin at 30%, and it sometimes does. If the schedule permits, we may not start until 60% for fear that plan design changes will affect utility conflicts.
1	When available, we will start coordination with companies using conceptual design plans (prior to having survey complete) or by sending an aerial map of the project locations. However, most of our coordination efforts begin when we have the survey plans complete showing existing conditions. As part of our coordination efforts we send the survey plans and proposed start of construction date to companies to let them know the project limits to obtain information on their existing facilities.
1	utilities section is involved from pre-scoping through construction
1	we are getting involved earlier and earlier as the designers see the benefits of early involvement. We have recently gotten involved at the Planning stages.

When do particular project stakeholders become involved in your utility coordination process (as a percent of the utility coordination and relocation process—the process being considered is from identified potential conflicts through the relocation of affected utilities)?

	Start	10%	30%	60%	90%
Project Design Managers	23 67.6%	2 5.9%	7 20.6%	2 5.9%	0 0.0%
In-house Designers	12 46.2%	6 23.1%	7 26.9%	1 3.8%	0 0.0%
Project Design Consultants	13 40.6%	9 28.1%	8 25.0%	2 6.3%	0 0.0%
Location Services	6 19.4%	12 38.7%	11 35.5%	2 6.5%	0 0.0%
ROW Agents/Managers	9 26.5%	5 14.7%	10 29.4%	9 26.5%	1 2.9%
Utility Owners	2 5.9%	14 41.2%	9 26.5%	9 26.5%	0 0.0%
Utility Contractors	0 0.0%	3 9.1%	5 15.2%	7 21.2%	18 54.5%
Utility Designers	1 3.1%	7 21.9%	11 34.4%	12 37.5%	1 3.1%
Construction Personnel	0 0.0%	4 16.0%	3 12.0%	5 20.0%	13 52.0%
Construction	0 0.0%	1 100.0%	0 0.0%	0 0.0%	0 0.0%
District Utility Coordinator	0 0.0%	0 0.0%	1 100.0%	0 0.0%	0 0.0%
In house Design	0 0.0%	1 100.0%	0 0.0%	0 0.0%	0 0.0%
SUE	0 0.0%	1 100.0%	0 0.0%	0 0.0%	0 0.0%
Utility Leader/Coordinator	1 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%

What has been your STA's level of implementation of the following SHRP2 Utility Focused practices?

	None	Little	Some	Complete	Unsure
SHRP2 R01A: 3D Utility Location Data Repository – technologies that support, store, retrieve, and use 3D utility location data	17 50.0%	5 14.7%	8 23.5%	1 2.9%	3 8.8%

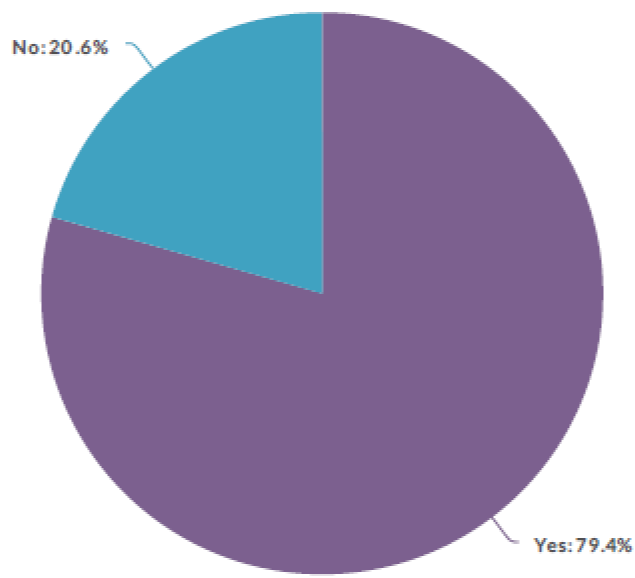
	None	Little	Some	Complete	Unsure
SHRP2 R01B: 3D Utility Investigation Technologies -- the advanced application of SUE through combining multiple technologies (multi-channel ground penetrating radar, time domain electromagnetic induction, etc.) based on soil type, utility material, terrain type, and other features	10 29.4%	6 17.6%	14 41.2%	1 2.9%	3 8.8%
SHRP2 R15B: Identifying and Managing Utility Conflicts -- the development and use of a utility conflict matrix and database system to manage utility conflicts throughout the design and construction	10 29.4%	4 11.8%	12 35.3%	6 17.6%	2 5.9%

Comments (please add comments, especially if you incorporated these practices prior to the SHRP2 projects, or if you are a pilot state for any of the above):

Count	Response
1	Lead adopter, working towards to full implementation.
1	MDOT is using a specialized SUE contractor to map utilities along a highway corridor in our coastal counties. This highway corridor was impacted heavily during hurricane Katrina. The resulting repairs of both highway and utility infrastructure created issues with location and as-built conditions of the utilities. We hope that the use of the 3D investigation technology will give us a better idea of where the utilities are in this area to minimize future impacts for projects.
1	Piloted R15B
1	UDOT is implementing R01A and has R15B funding to automate existing conflict management processes. Conflict matrices were used prior to the SHPR2 product release.
1	VDOT was pat of the R01A project and now has a grant fro R01B..r15B embellished VDOT's longstanding utility conflict matrix (form UT-9) so has been used for decades
1	We are discussing this technology on a regular basis. Mark Turner head of R/W surveys is the lead on this.

Count	Response
1	We have a database of all utility permits that can be searched and sorted based on multiple criteria. We also have all permits in electronic pdf's. We use a similar system to the utility matrix, but we do not use the actual matrix.
1	We may do some of the same procedures without the UT Conflict Matrix. We also have a DB to track the status of agreement approvals.
1	We utilize SUE and test holes on most projects but not directly per SHRP2 R01A or R01B. We have used UCMs on projects (most of which do not match the one outlined in R15B). However, we were just awarded a grant for R15B so we are looking to formalize our process so UCMs are used on a more consistent basis.

Is a single point of contact used to conduct and manage the utility coordination process (i.e. you attempt to have a single project utility coordinator for the life of the project)?



Value	Percent		Count
Yes	79.4%		27
No	20.6%		7
		Total	34

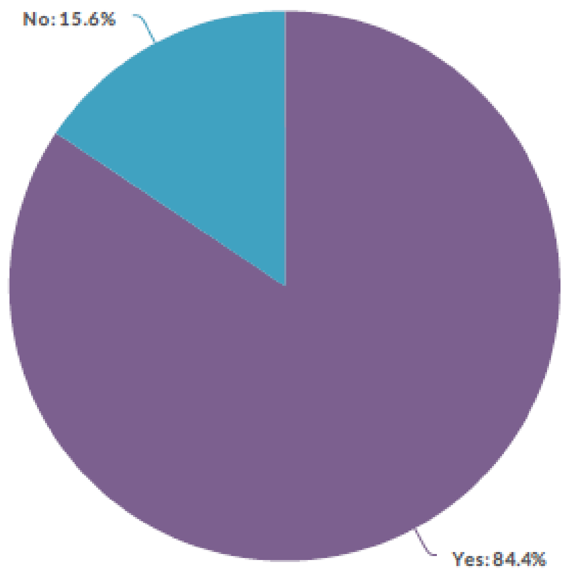
In regard to Questions 14, please expound as to how the utility coordination is managed.

Count	Response
1	1 Central office person and 1 district person work together with the district person doing the majority of the coordination.
1	A coordinator is assigned to a project prior to the kickoff of design and stays through the end of construction. They are a stakeholder in the development process.
1	Already answered above.
1	By the individual project manager
1	Each District has a Utility Relocation Administrator that coordinates utility relocations during design. There are seperated Construction Managers in each District that coordinate utility relocations during construction.
1	Each Region has a point of contact for the projects in their area.
1	Each Utility Coordinator (3) is responsible for the districts assigned to them and maintain ownership of the project through completion of the utility relocation process.
1	Each of MoDOT's 7 districts have a District Utility Engineer that handles all the relocations.
1	In district office by utility section staff.
1	In each Region is there is Region Utility Engineer that coordinates with the Project Engineers for each project.
1	Mainly coordinated by Region Utility Manager with assistance from Central Office.
1	Normally we stick with a project from cradle to grave. Typically no hand-off.
1	Our utility coordinators are broken up between roadway and structures projects and are assigned to a geographic region where they are responsible for the projects in that area.
1	Region staff have daily interact with utilities.

Count	Response
1	State Utilities Manager is based in Central Office and Regional Utilities Managers report directly to this position. Utility coordinators report to the Regional Utility Managers
1	The Regional Utility Engineer is responsible for utility co-ordination for all the projects in their Region. There are 11 Regions within NY State.
1	The Utility Engineer oversees a team of utility coordinators. One utility coordinator is assigned to each project that comes through out section and that coordinator stays with the project until construction is complete. We feel this leads to a better, more consistent coordination effort. The utility coordinator works with the project designer, project manager, utility companies, construction management personnel, etc. throughout project design and construction to identify utility facilities, potential conflicts, resolution, relocation, schedules, reimbursable items, etc. Each coordinator will have between 30 and 60 projects of varying complexities and schedules to work on in their queue.
1	The central office has one point of contact for each utility company. The field works with the local utility engineer on projects.
1	The district utility coordinator is the point of contact for utility owners, engineers, relocation contractors, and other personnel involved with a utility relocation project. We represent the interests of MDOT to outside personnel and communicate the project status and concerns of utilities to the appropriate internal staff.
1	The utility coordination during design is accomplished in the central office and the utility coordination during construction is accomplished by the districts.
1	Typically a Utility Coordinator is assigned a project at Project Imitation Document stage and develops and estimate of involvements and potential conflicts and follows the project through construction. Very lengthy process.
1	Typically on person the District Utility coordinator is the point of contact. This is project dependent and my vary.
1	Ultimate responsibility is the project managers' but the actual tasks may be delegated to other team members.
1	Usually this is with the District Utility Engineer
1	Utility Coordination by a utility specialist through the project manager
1	Utility Coordinators are assigned for the life of the project and located in the central office.
1	Utility Engineer will be heavily involved during the design phase and the District Utility Coordinator will be handling the construction phase and work directly with all involved parties.
1	Utility coordination for a project is managed in the region offices by the utility coordination staff. The staff is typically assigned a geographic area to manage within their region.
1	Utility coordinators are assigned projects during the planning phase. In addition, the central office utility coordinators are split into 3 groups covering east, central and west.
1	We have Agents that are assigned to specific projects
1	the project manager would be the one to set up meetings - collect utility data from the utility office - determine the need and or use of SUE. In a couple of cases the Region utility inspector acted as the Utility coordinator

Does your STA have a process for setting the scope (utility

relocation/coordination, project schedule/durations, and cost estimate) required for a project's utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

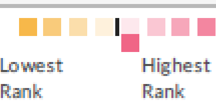


Value	Percent		Count
Yes	84.4%		27
No	15.6%		5
		Total	32

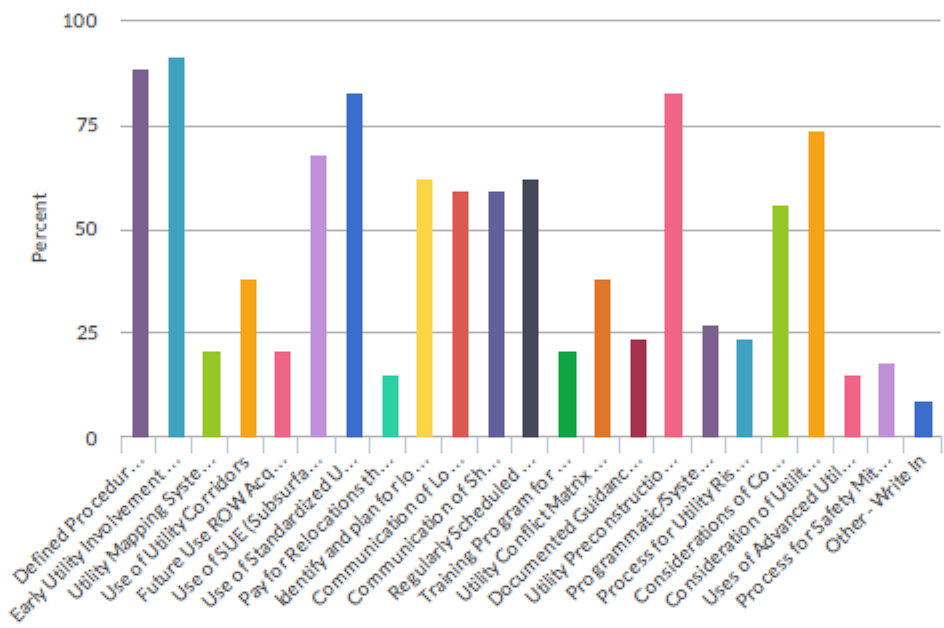
Please rank order the factors considered in scoping an individual project's utility coordination. (1 being the top consideration and 9 being the least important)

Rank	Item	Distribution	Score	No. of Rankings
1	Project Schedule		255	33

Rank	Item	Distribution	Score	No. of Rankings
2	Type of Utilities Involved		227	33
3	Level of Utility Risk		203	34
4	Number of Utilities Involved		195	31
5	Level of Coordination Effort		161	31
6	Number of ROW Parcels Involved		124	33
7	Project Classification (New Route, Road Widening, Resurfacing, etc.)		121	32
8	ROW Parcels Type (Residential, Commercial, Urban, Rural, etc.)		99	32
9	Location Classification (Urban versus Rural)		87	32



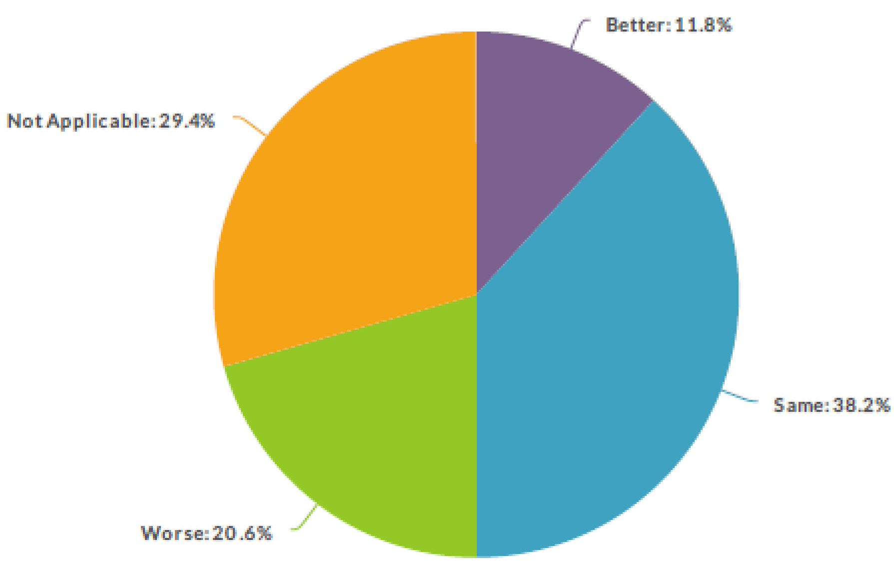
What utility coordination practices are used by your STA? (Please check all that apply; include practices that you use in a limited fashion or even as a trial. Many of these are not appropriate for use on every project.)



Value	Percent		Count
Defined Procedures (i.e., Utility Coordination Guidance Manual)	88.2%		30
Early Utility Involvement in Design (30% or earlier)	91.2%		31
Utility Mapping System (utility location information entered into a GIS based system)	20.6%		7
Use of Utility Corridors	38.2%		13
Future Use ROW Acquisition	20.6%		7
Use of SUE (Subsurface Utility Engineering)	67.6%		23
Use of Standardized Utility Agreements	82.4%		28
Pay for Relocations that are Traditionally Non-reimbursable	14.7%		5
Identify and plan for long-lead items	61.8%		21
Communication of Long-Range Transportation Plan	58.8%		20
Communication of Short-Range Transportation Plan	58.8%		20
Regularly Scheduled Meetings with Utility Companies	61.8%		21
Training Program for Design Engineers on Utility Coordination	20.6%		7
Utility Conflict Matrix Tracking System	38.2%		13
Documented Guidance on Utility Conflict Resolution Methods (by type of conflict)	23.5%		8

Value	Percent		Count
Utility Preconstruction Meetings	82.4%		28
Programmatic/System Collaborative Planning with Utilities (matching utility infrastructure plans to long-term highway plans)	26.5%		9
Process for Utility Risk Management	23.5%		8
Considerations of Costs & Reimbursements for Design/Construction versus Utility Relocations	55.9%		19
Consideration of Utilities Relocation Schedules in relation to Project Schedules	73.5%		25
Uses of Advanced Utility Location/Marking Technologies (Marker Balls, etc)	14.7%		5
Process for Safety Mitigation in Utility Coordination	17.6%		6
Other - Write In (click to view)	8.8%		3

Rate utility coordination involved with alternative contract procurement methods (design-build, P3, CMGC) in comparison to utility coordination on design-bid-build projects.



Value	Percent		Count
		Total	34

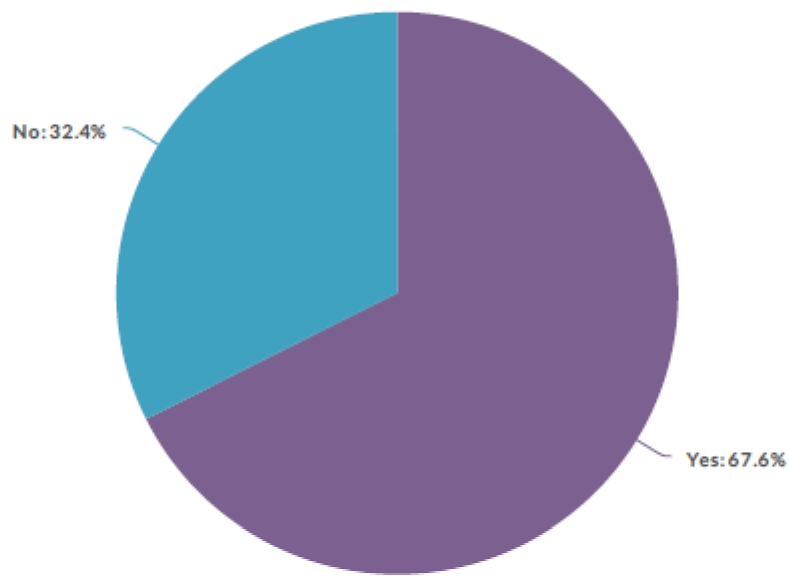
Value	Percent		Count
Better	11.8%		4
Same	38.2%		13
Worse	20.6%		7
Not Applicable	29.4%		10
		Total	34

In regard to Questions 19, please expound as to how the utility coordination is affected by alternative procurement methods.

Count	Response
1	At MoDOT we generally take on the utility risk/coordination for D/B projects so its essentially no change.
1	Design/Build negatively effects coordination when there are extensive impacts. Typically the schedule is short. If the D/B contractor is performing work for the utility, the costs are usually higher. Utilities do not like working with contractors of the DOT and still need a DOT contact. CMGC is very similar to DBB except the time between design completion and construction may be short or eliminated. This creates difficulty for utility owners to schedule or contract their work.
1	It is not always worse, generally our alternate procedure methods involves person not 100% familiar with our regs. Therein is the problem. We have to educate them.
1	MDOT has used alternate contract methods in a very limited capacity with design-build being the favored option of alternate delivery methods. This process puts the responsibility of utility relocation on the awarded contractor. From my experience this makes any relocation of conflicts more reactive than normal.

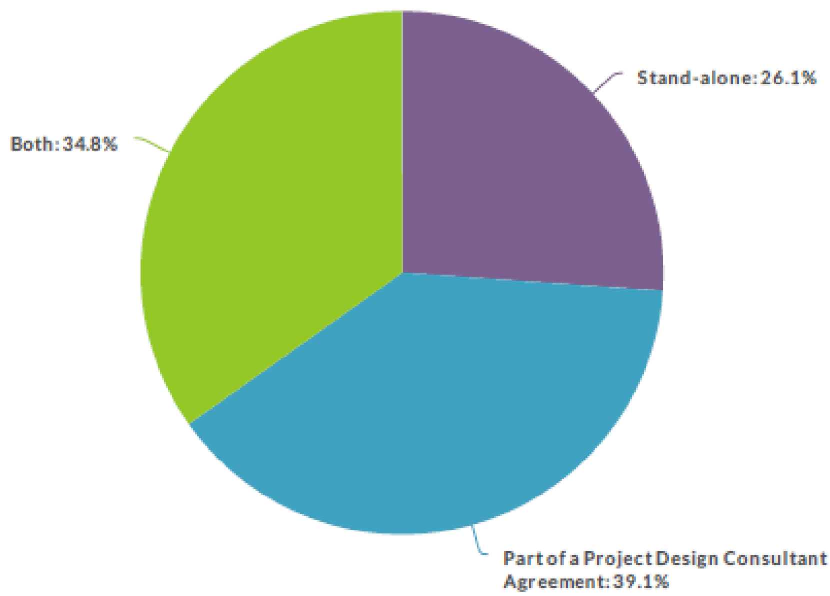
Count	Response
1	Regardless of the project, utility conflicts must be addressed. It's a challenge for the utility companies to meet the aggressive construction schedules as is the norm on design-build projects.
1	SUE is required for all of our Design-Build projects. This gives us better utility identification and utility involvement is earlier in the process.
1	Take more coordination because D/B teams are not familiar with DOT processes.
1	That is the individual project manager's choice.
1	The Utility process is typically the same. Depends on how involved the Utility Coordinator is. The tools may change a little the ACPM.
1	Typically not an adequate amount of time to get design completed, ROW acquired, and still allow the utility time to design and relocate.
1	Utility companies are wary of Design Build projects and it's been difficult getting the standard utility agreements processed with them.
1	Utilize dedicated utility coordinators for Design Build/P3 projects. LPA's have limited oversight or involvment
1	We are just getting into these types of projects so we are not sure how coordination will play out for them versus our design-bid-build projects at this time. However, our intent is currently to place the majority of the coordination responsibilities on the alternate procurement method team.
1	We are looking at the design - build concept in relation to utility relocation. We are also looking at CMGC at this time.
1	We don't employ design-build on projects.
1	Wisconsin has only done a pilot project or two in alternative contract procurement.
1	With a Design Build the contractor carries more risk regarding timely relocation and project completion. when incentive pay is a factor the coordination has a much higher consideration.
1	we have had limited DB and CMGC project here and in these cases the utility coordination and relocation were the same as normal projects.
1	we seldom use alternative procurement methods

Does your STA use consultant-led utility coordination (either as part of a stand-alone utility consultant agreement or a project design consultant agreement?



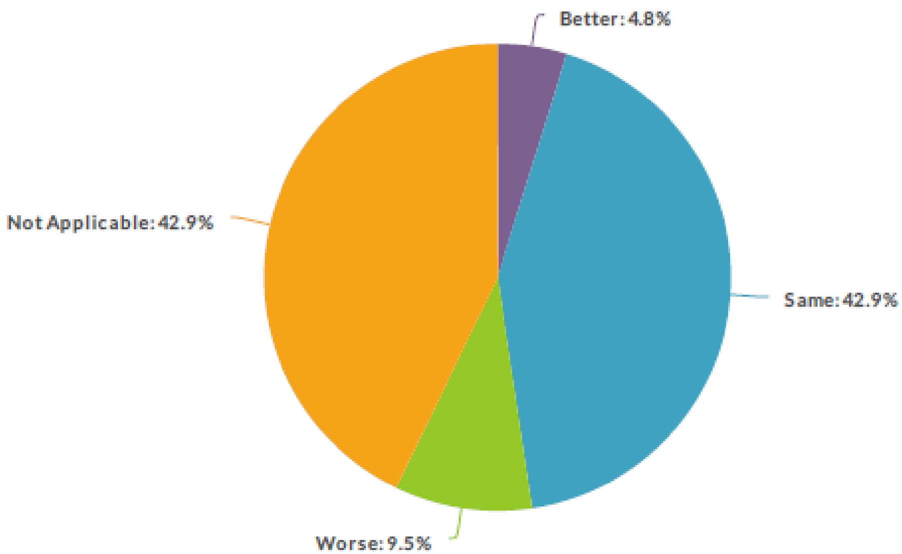
Value	Percent		Count
Yes	67.6%		23
No	32.4%		11
		Total	34

Please categorize your contracts associated with consultant-led coordination.



Value	Percent		Count
Stand-alone	26.1%		6
Part of a Project Design Consultant Agreement	39.1%		9
Both	34.8%		8
		Total	23

If you use a stand-alone utility consultant agreement, how would you rate consultant-led utility coordination relative to in-house?



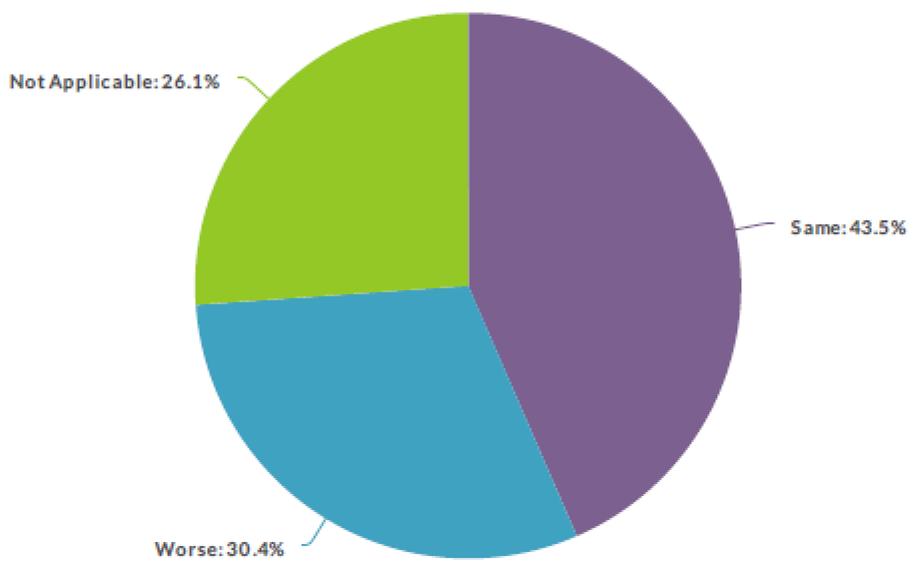
Value	Percent		Count
Better	4.8%		1
Same	42.9%		9
Worse	9.5%		2
Not Applicable	42.9%		9
		Total	21

If you use a stand-alone utility consultant agreement, how would you rate consultant-led utility coordination relative to in-house? - comments

Count	Response
1	I have to qualify the following statement by saying this is to the best of my knowledge. We have four companies under master agreement for utility investigation and relocation purposes. We have used one company to manage a relocation project. The feedback that I have received from utility owners trends toward the negative based on their experiences. But this could be due to the congestion within the utility corridors and the complexity of the project.
1	It is very dependent on the company/project. Some do very well and are above our in-house while others require more involvement from our in-house staff. We always have an in-house coordinator assigned to projects to oversee the consultant coordination projects and to assist as needed.

Count	Response
1	Require UCCC to perform "deconfliction" meetings which with staff resources we do not have time to perform on every project.
1	We have a SUE Consultant Agreement that includes an option to have the Consultant do utility co-ordination but we haven't used this option yet.
1	We have just begun a pilot project with consultant led utility coordination. Final results are not yet available.
1	We tried a stand-alone coordinator, but some training was needed on our procedures and we were not satisfied with the process. We do allow utilities to outsource their utility relocation design and field inspection on an individual utility basis.
1	Wisconsin has found that it really all goes to the interest of the person in utility coordination and the skills and experience of the person involved.

If the utility coordination is part of a project design consultant agreement, how would you rate consultant-led utility coordination relative to in-house?



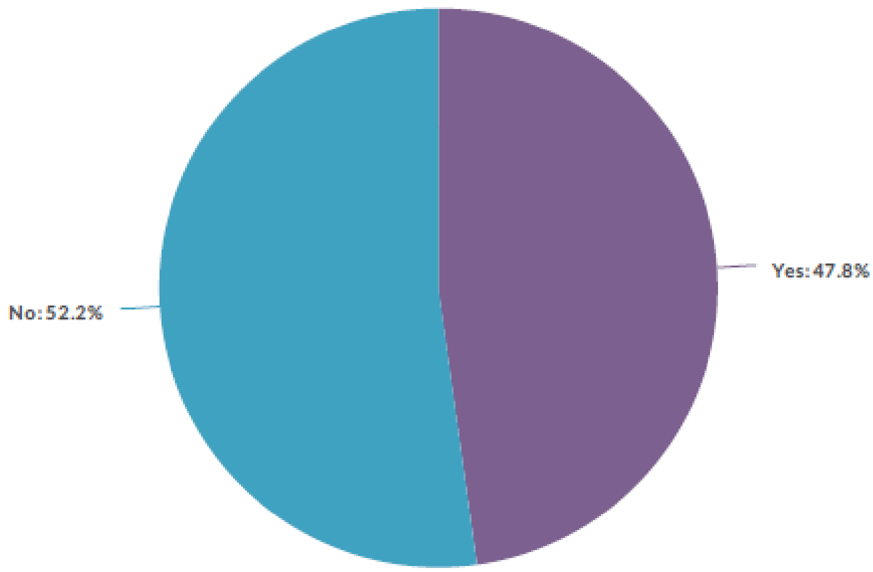
Value	Percent		Count
Same	43.5%		10
Worse	30.4%		7
		Total	23

Value	Percent		Count
Not Applicable	26.1%		6
		Total	23

If the utility coordination is part of a project design consultant agreement, how would you rate consultant-led utility coordination relative to in-house? - comments

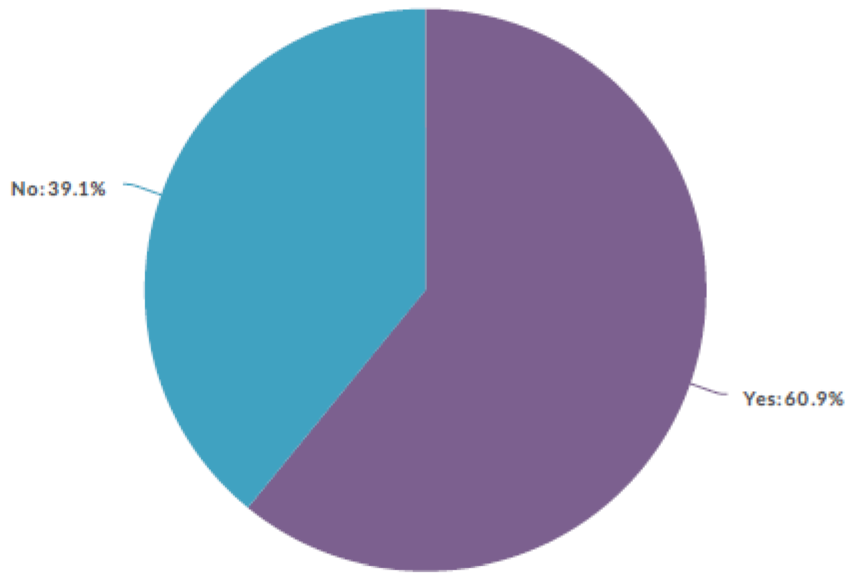
Count	Response
1	Again, this is very dependent on the company/project and how the agreement is structured. Some companies do an amazing job. Others do not and our in-house staff has to be much more involved. We always have an in-house coordinator assigned to projects to oversee work and to assist as needed.
1	It depends upon the consultant. Some perform at a high level. Others at a lower level. If the coordination is part of a project design contract, the utility coordination work usually does not drive the selection of the consultant.
1	Not always worse, as stated previously they are sometimes less than knowledgeable of our regs.
1	Seems as though being a contract requirement which can be rated leads to better involvement than in-house staff at times.
1	Skills are usually limited and so each project is a learning opportunity. STA is a very small staff, so this is the only way coordination will work.
1	These people typically do not have an interest in utility coordination, have not performed utility coordination on a regular basis, and as such the quality is not the same. Typically, Wisconsin tries to limit risk by having oversight of the design consultants and limiting activities that the consultant performs.
1	Unqualified staff used in these psoitions

Does your agency require pre-qualifications (including qualification as part of the consultant solicitation) for consultant-led utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)



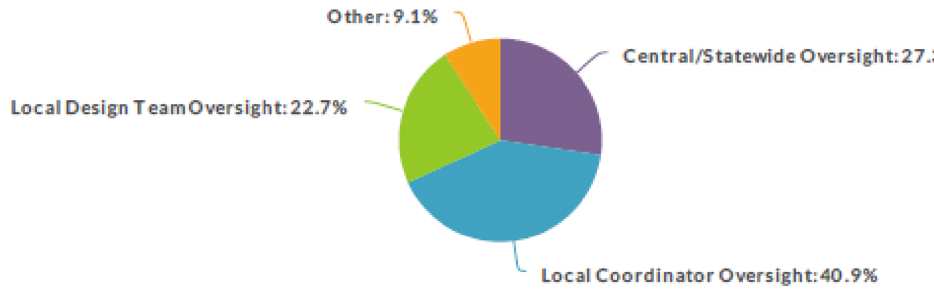
Value	Percent		Count
Yes	47.8%		11
No	52.2%		12
		Total	23

Does your agency evaluate performance in consultant-led utility coordination? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)



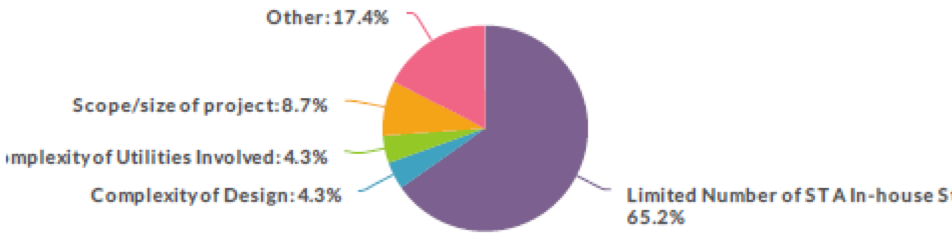
Value	Percent		Count
Yes	60.9%		14
No	39.1%		9
		Total	23

How does the STA manage the consultant-led utility coordination? (Select the best answer relative to your STA)



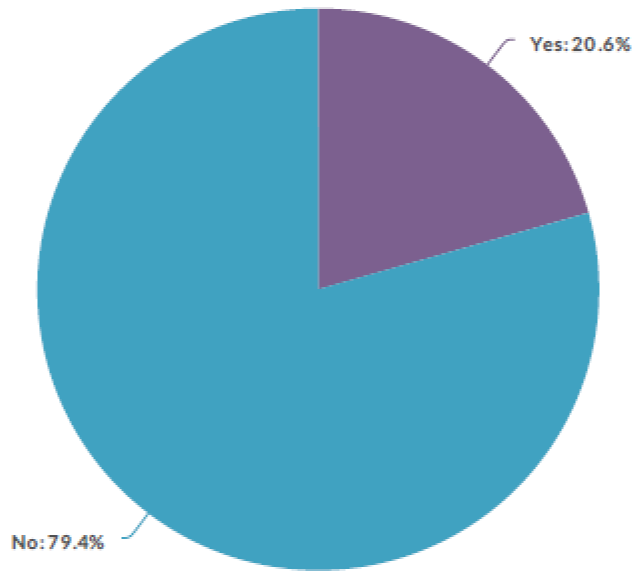
Value	Percent		Count
Central/Statewide Oversight	27.3%		6
Local Coordinator Oversight	40.9%		9
Local Design Team Oversight	22.7%		5
Other (click to view)	9.1%		2
		Total	22

Why does your STA use consultant-led utility coordination? (Select the best answer relative to your STA)



Value	Percent		Count
Limited Number of STA In-house Staff	65.2%		15
Complexity of Design	4.3%		1
Complexity of Utilities Involved	4.3%		1
Scope/size of project	8.7%		2
Other (click to view)	17.4%		4
		Total	23

Does your STA make available and/or require any certification or training for utility coordination? (If no, skip to the next section of questions) (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

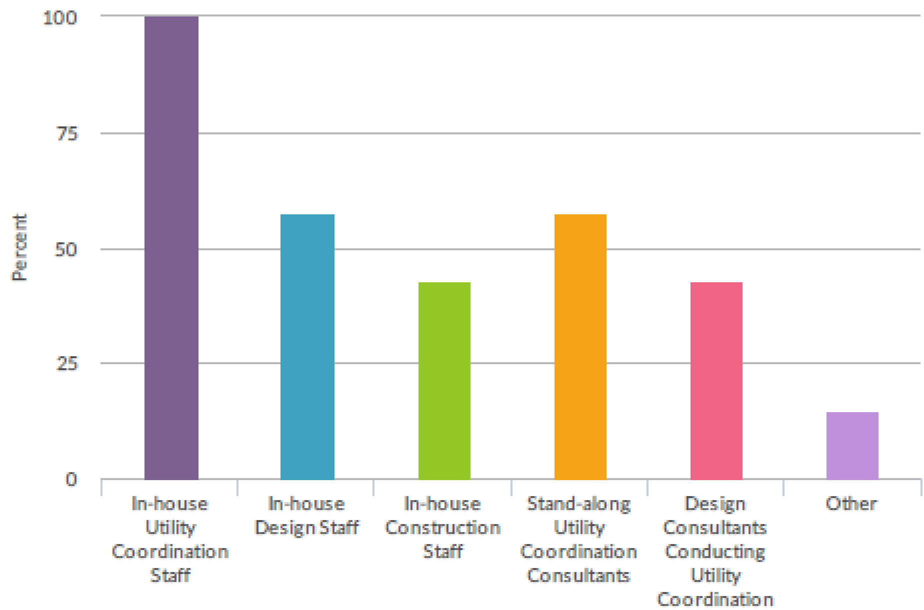


Value	Percent		Count
Yes	20.6%		7
No	79.4%		27
		Total	34

Does your STA make available and/or require any certification or training for utility coordination? (If no, skip to the next section of questions) (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.) - comments

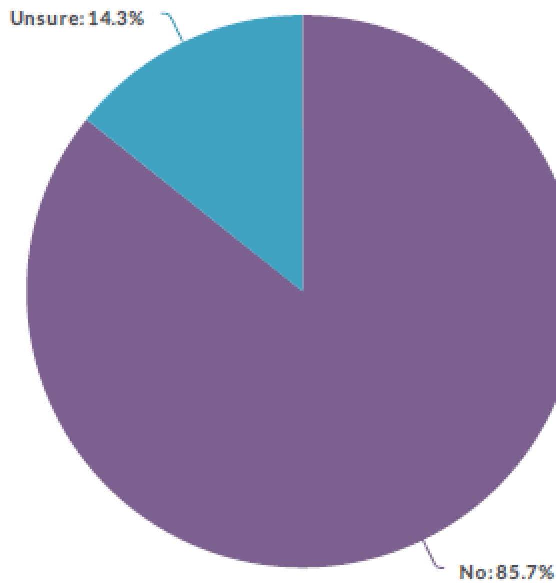
Count	Response
1	HQ R/W Utilities delivers an 1 week Academy annually. Current and future Utility Coordinators from the District are selected to atttend.
1	We do not currently provide or require certification or training for utility coordination. We do provide various types of training presentations depending on need but have not given training for overall utility coordination for many years now.
1	in planning stages now
1	training on utility processes is done every year for internal and external customers. This is not required.

What stakeholder groups are offered training in utility coordination by your STA? (Select all that apply.)



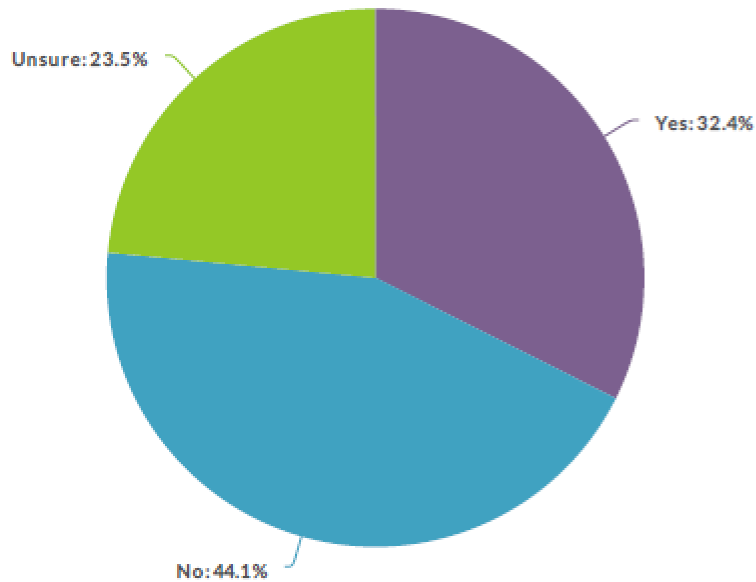
Value	Percent	Count
In-house Utility Coordination Staff	100.0%	7
In-house Design Staff	57.1%	4
In-house Construction Staff	42.9%	3
Stand-along Utility Coordination Consultants	57.1%	4
Design Consultants Conducting Utility Coordination	42.9%	3
Other (click to view)	14.3%	1

Do any universities/trade programs/technical colleges offer utility coordination curriculum within your state?



Value	Percent		Count
No	85.7%		6
Unsure	14.3%		1
		Total	7

Do you find there are inconsistencies in state or federal legislation or regulations causing utility coordination issues?

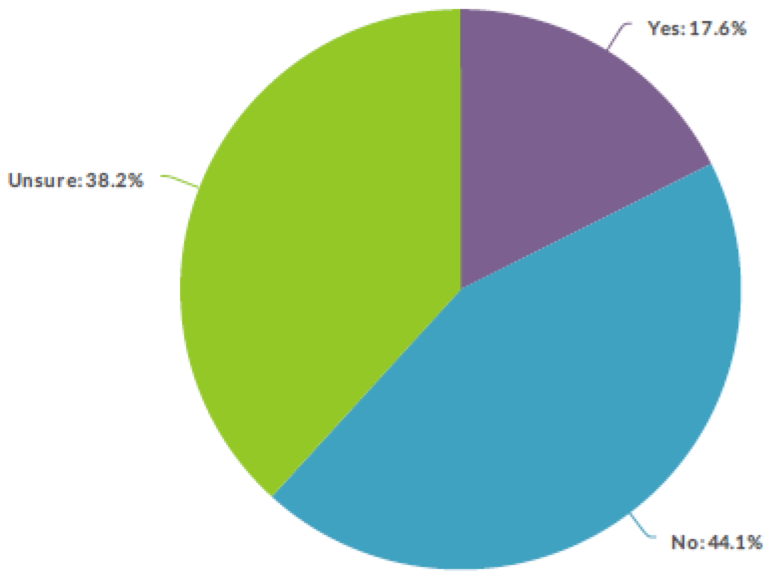


Value	Percent		Count
Yes	32.4%		11
No	44.1%		15
Unsure	23.5%		8
		Total	34

If the response to the last question is yes, please give a brief description below so we can further research the inconsistencies.

Count	Response
1	1. Buy America is a burden on Utility Companies! 2. 7901 Franchise by AT&T
1	Buy America
1	Buy America requirements should be more definitive.
1	Federal regulations in respect to engineering costs prior to signed agreements. Planners need to look at the conflicts in order to prepare a realistic estimate for engineering, design, material acquisition and construction.
1	In my opinion, our state legislation does not grant us the power needed to manage the relocation projects efficiently. I believe we should be able to assess penalties to utilities that do not relocate in a timely manner. We offer the incentive of reimbursement but there is no disincentive.
1	Insufficient guidance on Buy America requirements/implementation
1	Rules say that engineering fees for design and FE & I can't be based on a percentage of construction estimate. However, some utilities would accept a fee based on a percent that is far below what we would accept from a detailed estimate, but we are not supposed to allow that method to be used. Some utilities are not even set up to track the individual man hours of the people working on the project.
1	State to State is different
1	The legislation/regulation that has caused the most concern is Buy America, especially considering the recent court ruling, There may be others but may be others but I cannot think of them at this time. Additionally, our State legislation & regulations have not caused utility coordination inconsistencies since we oversee in a centralized/statewide manner.
1	state law does not allow for utility corridors or to purchase easements for utility companies. Some utility companies are not allowed to purchase easements either.

Do you find there are guidance (STA guidance manuals, Federal guidance, etc.) related inconsistencies causing utility coordination issues?

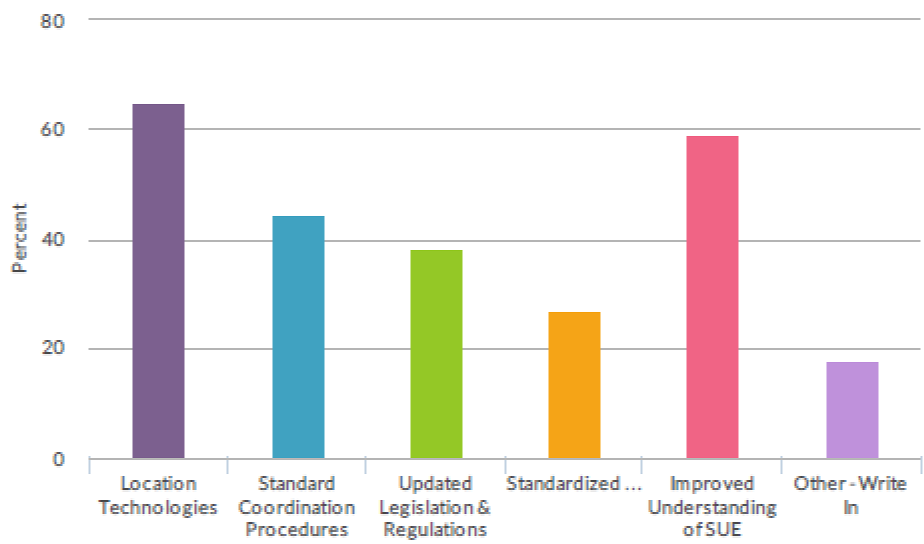


Value	Percent		Count
Yes	17.6%		6
No	44.1%		15
Unsure	38.2%		13
		Total	34

If the response to the last question is yes, please give a brief description below so we can further research the inconsistencies.

Count	Response
1	HQ R/W Utilities has found it necessary to work closely with Cal. Division of FHWA to resolve many issue most notably the Buy America requirement. Cal. FHWA are great partners!
1	Insufficient guidance on Buy America requirements/implementation
1	State to State different
1	There is guidance but it is too vague in regard to Buy America. With the recent court decision, guidance is now worse.
1	lack of federal guidance on major issues -- Buy America

Which areas seem to be of most need relative to the future of the utility engineering field? (Select your top 3).



Value	Percent	Count
Location Technologies	64.7%	22
Standard Coordination Procedures	44.1%	15
Updated Legislation & Regulations	38.2%	13
Standardized Relocation Cost Rates (Predetermined Schedule of Costs)	26.5%	9

Value	Percent		Count
Improved Understanding of SUE	58.8%		20
Other - Write In	17.6%		6

What knowledge gaps (areas for future technology, current legislation needs, etc.) do you see in the field of utility coordination?

Count	Response
1	Allow engineering to be a reasonable percentage of construction estimate. As a rule of thumb, engineering for design and field engineering and construction is 15%. Some utilities would normally charge 12%, but we require a detailed estimate that has to be fabricated to meet the requirement.
1	I was unable to write in a suggestion though I selected "other" as a response to the question above. Utility coordination requires an understanding of DOT project design, utility construction and utility design. That combined with an understanding of processes, legislation, regulations and good soft skills is hard to find as the years go by. The biggest knowledge gap I see is having a standardized education/training curriculum available from a national level to help build/fulfill these needs so utility coordination skills can be strengthened as the national workforce is changing with our most knowledgeable/experienced individuals retiring.
1	In Wisconsin, the utility unit should be more or less a RLS, plat expert, real estate expert, design expert, and understand construction contract requirements. This entire skill set is hard to find.
1	Knowledge of technology available.
1	Lack of knowledge of lead times and/or schedules.
1	Lack of training for utility persons doing our work. We as a Transportation Cabinet need to have pre-qualifications.
1	Lack of upper management fully understanding risks with the utility relocation aspect of projects..Specifically at our District Administrator level

Count	Response
1	Legislation: Fine non-responsive utility companies for project delays.
1	More use of SUE and related technologies
1	Mostly the strong need education on the need for effective coordination.
1	N/A
1	Not only the use of SUE, but how to pay for it during the design stage.
1	Our process seems to be random, since it is left to individual project managers.
1	Placement Locations
1	Removal of the Buy America requirements for Utilities companies. It is a burden that will drive up the cost of relocations unnecessarily.
1	The gathering and storage of as-built data in repositories for future access and use. The problem being that there is not a nationwide standardized method for collecting data. With consultants coming from several locations throughout the nation to work on projects, without that it becomes hard for one state to assimilate possible incompatible data that may be standard in another state. Technologies should be regulated in such a way that no matter who uses who's collection program, it will produce a standard output acceptable to all with the need of a translator to assimilate the data.
1	Trained and dedicated personnel to perform utility co-ordination.
1	Training curriculum and programs specific to utility coordination National certification programs Technology to collect and view 3D as-built data more efficiently and accurately CADD tools to enhance and simplify utility clash detection with varying quality levels of utility data and with soft clash criteria Mature digital project delivery methods
1	We have the technology to produce digital maps of state assets and utilities. I believe we should use the best methods possible to be proactive with utility risk and mitigation. We could have digital right of way maps to provide to utilities for permitting purposes at the cost of requiring digital as-builts from these utilities. This could be fed into an area map (state, county, etc.) to be used for project planning purposes to examine potential conflicts, amount of right of way needed for utility corridors, and to design in the most cost effective way possible.
1	better mapping and as builts of utilities
1	location of facilities -- older facilities are not documented clearly. few engineers ever see utilities until they have a project that is delayed because of them -- the old mentality of just tell them to move it. All engineers should have training on utility requirements and issues as part of their transportation classes.

Questions 1 asked, “Does your agency use documented procedures (manual of instructions, policy and/or guidance manual) for utility coordination?” If you responded yes, please attach any documentation (or relevant tools) in the form of text, web link(s), file(s), or contact information to make a request for the information below.

Count	Response
1	Below is a link to our current DelDOT Utility Manual. It is currently under revision. The second link is to the general page with other content that might be relevent. Please note, we have updated our utility coordination guidelines internally and have yet to post them since we are revising the manual. That being said, our updated, draft internal utility coordination guidelines are attached. http://deldot.gov/information/business/drc/manuals/utilities_manual_2008_may_5.pdf http://deldot.gov/information/business/drc/utilities.shtml
1	Contact Britt Tucker. 775-888-7311
1	In the process of rewriting
1	Please see the web address below: http://www.dot.ca.gov/hq/row/rowman/manual/ch13.pdf
1	We have check lists for individual plan issuances, database searches, document management procedures -- no room to add these to this section.
1	We have the SOPs and legislation that act as a guide for relocation. We have recently implemented a new utility management software that will be used to track dates, cost, and request funding for relocation projects. The "means and methods" are individual to some extent to the utility coordinator.
1	http://arkansashighways.com/right_of_way_division/utility_accomodation.aspx
1	http://epg.modot.mo.gov/index.php?title=Category:643_Utility_Procedures
1	http://transportation.ky.gov/Right-of-Way-and-Utilities/Pages/Utility-Coordination.aspx
1	http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/util/ucguide.aspx http://wisconsindot.gov/rdwy/fdm/fd-18-00toc.pdf
1	http://www.ct.gov/dot/lib/dot/documents/dutilities/UtilityPolicyProcedures.pdf
1	http://www.dot.nd.gov/manuals/design/designmanual/reference-forms.htm
1	http://www.dot.state.ak.us/stwddes/dcspubs/index.shtml#
1	http://www.dot.state.al.us/rwweb/doc/proceduralmanuals/ALDOT_Design_utman.pdf
1	http://www.udot.utah.gov/main/f?p=100:pg:0::::V,T:,3508 http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:3834,

Count	Response
1	https://connect.ncdot.gov/municipalities/Utilities/Pages/UtilitiesManuals.aspx
1	https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm/chapter-13
1	manual link

Please upload files here

5 Files Uploaded

Questions 6 asked, "Has your agency performed any analysis of the effectiveness (in terms of the amount of utility delays during construction, percent of relocations complete prior to letting, or letting delays due to utilities) of your procedures for utility coordination? " If you responded yes, please attach any associated documentation of the analysis in the form of text, web link(s), file(s), or contact information to make a request for the information below.

Count	Response

Count	Response
1	Construction Bureau has arranged meetings to address contractor claims based on utility relocation delays. I asked for data and they had to pull the information from work files. They weren't tracking it, so it was a perceived problem. There were 12 utility related delays over 4 years. Seven had been denied and the associated cost of the remainder was less than a million dollars. Almost 2/3 of the cost was related to only one project. During that period, I estimated that we had reimbursed utilities more than 80 million dollars! There were probably 400 non-reimbursable agreements executed during the study period. The issue has not been raised again.
1	I do not have documentation to support this answer but the central office may. I know this is a reason that we have implemented new software recently.

Please upload files here

0 Files Uploaded

Questions 16 asked, "Does your STA have a process for setting the scope (utility relocation/coordination, project schedule/durations, and cost estimate) required for a project's utility coordination?" If you responded yes, please attach any documentation in the form of text, web link(s), file(s), or contact information to make a request for the information below.

Count	Response
1	MnDOT uses Primavera P6 for project scheduling http://www.dot.state.mn.us/pm/p6.html
1	See ucguide link above. This guidance is within several chapters of this guide.

Count	Response
1	Standard UCM per R015B
1	We have macros attached to most of our files for easy entry. These files cannot be uploaded.
1	We obtain a relocation schedule from each utility in conflict. That information is included in a Utility Certificate that becomes a Special Provision as part of the construction contract.
1	http://arkansashighways.com/right_of_way_division/ROW%20Utilities%20Internal%20Policy%20and%20Procedures.pdf
1	http://epg.modot.mo.gov/index.php?title=Category:643_Utility_Procedures
1	http://transportation.ky.gov/Right-of-Way-and-Utilities/Pages/Utility-Coordination.aspx
1	http://www.dot.nd.gov/manuals/design/designmanual/reference-forms.htm
1	http://www.dot.state.ak.us/stwddes/dcspubs/index.shtml#
1	https://connect.ncdot.gov/municipalities/Utilities/Pages/Process.aspx
1	https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm/chapter-13
1	no
1	see above

Please upload files here

2 Files Uploaded

Questions 25 asked, "Does your agency require pre-qualifications (including qualification as part of the consultant solicitation) for consultant-led utility coordination? " If you responded yes, please attach any documentation below on the types of pre-qualifications required in the form of text, web link(s), file(s), or contact information to make a request for the information.

Count	Response
1	The attached RFQ is the closest we come to pre-qualifications. Please use to extrapolate any info needed but do not include the document in any literature moving forward.
1	http://epg.modot.mo.gov/index.php?title=Category:134_Engineering_Professional_Services
1	https://connect.ncdot.gov/business/Prequal/Pages/default.aspx

Please upload files here

1 File Uploaded

Questions 26 asked, "Does your agency evaluate performance in consultant-led utility coordination?" If you responded yes, please attach any documentation in the form of text, web link(s), file(s), or contact information to make a request for the information below.

Count	Response
1	All evaluation is reviewed internally by the Utilities Unit. Contact Mr. O'Hara Parker at 919.707.7171 or oparker @ncdot.gov

Count	Response
1	Attached is a blank evaluation form that is used to evaluate performance of our open-end SUE contract. This contract includes utility coordination services so those services are taken into consideration as part of this.
1	See DT1558 Design Consultant Performance Evaluation Report at the following link: http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrces/contracts/misc.aspx
1	We only outsourced project utility coordination one time. We were not satisfied with the outcome, we have not used it again.
1	http://epg.modot.mo.gov/index.php?title=Category:134_Engineering_Professional_Services

Please upload files here

1 File Uploaded

You were previously asked, "Does your STA make available and/or require any certification or training for utility coordination?" If you responded yes, please attach any documentation in the form of text, web link(s), file(s), or contact information to make a request for the information below.

Count	Response
1	HQ R/W delivers an Utility Academy annually. The information is to large a volume to attach.
1	http://epg.modot.mo.gov/index.php?title=Category:134_Engineering_Professional_Services

Appendix E: National Synthesis— Non-State Department of Transportation Stakeholder Survey Questionnaire

NCHRP Topic 47-14 Non-State Stakeholder Survey Questionnaire
November 2015

Synthesis 47-14 seeks to determine how previous research has been incorporated into current practice and compile information about how State Transportation Agencies (STAs) and utility stakeholders are scoping, conducting, and managing effective utility coordination. Additional information will be collected on factors including:

- Identification of the core elements of effective utility coordination;
- Current practices to manage consultant-led utility coordination, both stand alone and those incorporated into design contracts;
- Current practices to perform utility coordination in-house;
- How and when stakeholders are integrated into the utility coordination process (e.g. design team, contractors, utility owners, consultants, resource agencies, etc.);
- Pre-qualification requirements for consultants and evaluation measures of performance;
- Training and certification available and/or required for utility stakeholders;
- How academic programs are educating students about utility engineering;
- The process by which an effective utility coordination project is scoped (e.g. project schedule, type and complexity of project, level of effort, level of risk, etc.);
- Gaps in knowledge and research;
- Examples of inconsistencies between legislation, regulations, guidance, and practice.

Pilot tests indicated an average time of [X] minutes to complete the survey.

Please complete the online questionnaire by [date]. If you have questions or would prefer to complete a paper copy questionnaire, please contact:

Roy Sturgill	Email: roy.sturgill@uky.edu	Phone (859) 218-0119

Please identify your contact information. NCHRP will email you a link to the online report when it is completed.

Company/Agency:

Address:

City: ______________________ State: __________ ZIP:

Questionnaire Contact:

Position/Title:

In case of questions and for NCHRP to send you a link to the final report, please provide:

Tel: ______________________________ Email:

General Utility Coordination Process Information

1. Which of the following best describes your agency?

   ☐Utility Coordination Consultant

   ☐Road Design Consultant Conducting Utility Coordination

   ☐Utility Owner (Design/Construction/Management)

   ☐Utility Designer (Consultant to Utility Company)

   ☐Utility Contractor (Consultant to Utility Company)

   ☐Researcher

   ☐Other <u>46T</u>

2. If your agency/company manages the utility coordination for a STA, do you use documented procedures (policy and/or guidance manual)? (There is a follow-up opportunity to provide documentation, web link(s), file(s), or contact information at the conclusion of this survey.)

   ☐Yes ☐No ☐Not Applicable

3. Would you be willing to participate in a follow-up phone interview?

   ☐Yes ☐No

4. Does your company have an interest in improved utility coordination regarding an STA's schedule and budget (i.e., our company strives to aid in STA project success)?

   ☐Yes ☐No ☐Unsure

   Please provide comments regarding your response: <u>46T</u>

5. What **<u>core</u>** elements would you consider the most vital for an effective utility coordination process? (Please select your **<u>top 8 choices</u>**)

   ☐Defined Procedures (i.e., Utility Coordination Guidance Manual)

   ☐Early Utility Involvement in Design (30% or earlier)

   ☐Utility Mapping System (utility location information entered into a GIS based system)

   ☐Use of Utility Corridors

☐Future Use ROW Acquisition

☐Use of SUE (Subsurface Utility Engineering)

☐Use of Standardized Utility Agreements

☐ Pay for Relocations that are Traditionally Non-reimbursable

☐Identify and plan for long-lead items

☐ Communication of Long-Range Transportation Plan

☐ Communication of Short-Range Transportation Plan

☐ Regularly Scheduled Meetings with Utility Owners

☐Training Program for Design Engineers on Utility Coordination

☐Utility Conflict Matrix Tracking System

☐Documented Guidance on Utility Conflict Resolution Methods (by type of conflict)

☐Utility Preconstruction Meetings

☐Programmatic/System Collaborative Planning with Utilities (matching utility infrastructure plans to long-term highway plans)

☐Process for Utility Risk Management

☐ Considerations of Costs and Reimbursements for Design/Construction versus Utility Relocations

☐Consideration of Utilities Relocation Schedules in relation to Project Schedules

☐Uses of Advanced Utility Location/Marking Technologies (Marker Balls, etc)

☐Process for Safety Mitigation in Utility Coordination

☐Other 46T

6. At what point in project development, does your company's typically get involved regarding utility coordination? (Select the answer based upon your agency/company experience)

☐During Planning

☐10% Project Design Complete

☐30% Project Design Complete

☐60% Project Design Complete

☐90% Project Design Complete

Comments: 46T

7. Is a single point of contact used to conduct and manage the utility coordination process (i.e. you attempt to have a single project utility coordinator for the life of the project)?

☐Yes ☐No ☐Not Applicable

8. In regard to Questions 7, please expound as to how the utility coordination is managed.

46T

9. Which of the following practices have witnessed being used within utility coordination? (Please check all that apply)

☐Defined Procedures (i.e., Utility Coordination Guidance Manual)

☐Early Utility Involvement in Design (30% or earlier)

☐Utility Mapping System (utility location information entered into a GIS based system)

☐Use of Utility Corridors

☐Future Use ROW Acquisition

☐Use of SUE (Subsurface Utility Engineering)

☐Use of Standardized Utility Agreements

☐ Pay for Relocations that are Traditionally Non-reimbursable

☐Identify and plan for long-lead items

☐ Communication of Long-Range Transportation Plan

☐ Communication of Short-Range Transportation Plan

☐ Regularly Scheduled Meetings with Utility Owners

☐Training Program for Design Engineers on Utility Coordination

☐Utility Conflict Matrix Tracking System

☐Documented Guidance on Utility Conflict Resolution Methods (by type of conflict)

☐Utility Preconstruction Meetings

☐Programmatic/System Collaborative Planning with Utilities (matching utility infrastructure plans to long-term highway plans)

☐Process for Utility Risk Management

☐ Considerations of Costs and Reimbursements for Design/Construction versus Utility Relocations

☐Consideration of Utilities Relocation Schedules in relation to Project Schedules

☐Uses of Advanced Utility Location/Marking Technologies (Marker Balls, etc)

☐Process for Safety Mitigation in Utility Coordination

☐Other 46T

☐Other 46T

10. Rate utility coordination involved with alternative contract procurement methods (design-build, P3, CMGC) in comparison to utility coordination on design-bid-build projects.

    ☐Better ☐Same ☐Worse ☐Not Applicable

11. In regard to Questions 10, please expound as to how the utility coordination is affected by alternative procurement methods.

    46T

Practices Related to Consultant-led Utility Coordination

12. How would you rate consultant-led utility when compared to coordination by STA staff?

☐Better ☐Same ☐Worse ☐Not Applicable

13. Please categorize the types of contracts your organization has used or been involved in associated with consultant-led coordination.

☐Stand-alone ☐Incorporated into Project Design ☐Both ☐None

14. Does your agency/organization require or been required to attain pre-qualifications for consultant-led utility coordination?

☐Yes ☐No ☐N/A

15. Has your agency/organization evaluated, or been evaluated on, performance in consultant-led utility coordination?

☐Yes ☐No ☐N/A

16. Would you like to note any challenges relative to consultant-led utility coordination?

46T

17. Would you like to note any opportunities relative to consultant-led utility coordination?

46T

Utility Coordination Certification, Training, and Education Questions

18. Does your agency/company make available or been required to have any certification or training for utility stakeholders? (If no, skip to the next section of questions)

    ☐Yes ☐No

19. If the response to Questions 18 is yes, please discuss below.

    46T

20. Do any universities/trade programs/technical colleges offer utility coordination curriculum within your state?

☐Yes ☐No ☐Unsure

Utility Related Legislation, Regulations, and Guidance Questions

21. Do you find there are inconsistencies in state or federal legislation or regulations causing utility coordination issues? (If no, skip the next question)

    ☐Yes ☐No

22. If the response to Questions 21 is yes, please give a brief description below so we can further research the inconsistencies.

    46T

23. Do you find there are guidance (STA guidance manuals, Federal guidance, etc.) related inconsistencies causing utility coordination issues? (If no, skip the next question)

    ☐Yes ☐No

24. If the response to Questions 23 is yes, please give a brief description below so we can further research the inconsistencies.

    46T

Future Opportunities

25. Which areas seem to be of most need relative to the future of the utility engineering field? (Select your **top 3**).

    ☐Location Technologies

    ☐Standard Coordination Procedures

    ☐Updated Legislation and Regulations

    ☐Standardized Relocation Cost Rates (Predetermined Schedule of Costs)

    ☐Improved Understanding of SUE

    ☐Other 46T

    ☐Other 46T

26. What knowledge gaps (areas for future technology, current legislation needs, etc.) do you see in the field of utility coordination?

    46T

Follow-up Documentation

27. Questions 2 askes, “If your agency/company manages the utility coordination for a STA, do you use documented procedures (policy and/or guidance manual)?” If you responded yes, please attach any documentation below on the types of pre-qualifications required in the form of text, web link(s), file(s), or contact information to make a request for the information.

    46T

The survey is complete. Thank you for your participation!

Appendix F: National Synthesis—Interview Questionnaire

NCHRP Synthesis 47-14: EFFECTIVE UTILITY COORDINATION: APPLICATION OF RESEARCH AND CURRENT PRACTICES

INTERVIEWEE: **DATE:**

1. Discuss utility coordination at your DOT.
   a. What methods standout as contributing to your utility coordination success?
   b. How would you improve your DOT's handling of utility coordination?
   c. Do you measure utility coordination effectiveness, qualitatively or quantitatively?
   d. Have you made any recent changes to the way you conduct utility coordination? Any incorporation of recent research?
   e. In what ways do you feel you are effectively applying recent utility coordination research and current practices?
   f. Have you incorporated any new technologies within utility coordination recently? Have those been successful?
   g. How and when should utility coordination be initiated during a project?
2. Do you use consultant-led utility coordination? If so, what leads to that decision? What is your experience with it; benefits, problems, etc.?
3. Do you think proper training and education exists for utility coordination and can you provide example?
4. Discuss any knowledge gaps and needs relative to utility coordination.
5. Could you briefly describe a project with your DOT with successful utility coordination? How about a project that was problematic?

Appendix G: Websites for State Departments of Transportation Utility Coordination Procedures

Links to STA Utility Coordination Procedures

State	Document/Web page Title	Link
WY	Operating Policy 19-7: Utility and Railroad Adjustments	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/180-5fb0edece4782da40c4d413d6b70602a_OpPolicy_19-7.pdf
	Operating Policy 19-3: Right-of-Way Encroachment	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/26-5fb0edece4782da40c4d413d6b70602a_OpPolicy_19-3.pdf
	Utility Relocation Assistance	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/57-5fb0edece4782da40c4d413d6b70602a_2012-Nov+2++Chapter+28.pdf
	Utility Accommodation Regulation	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/248-5fb0edece4782da40c4d413d6b70602a_WYDOT+Utility+Accommodation+Regulations_Dec+2012.pdf
CA	Utility Relocations	http://www.dot.ca.gov/hq/row/rowman/manual/ch13.pdf
AR	Utility Accommodation Policy	http://arkansashighways.com/right_of_way_division/utility_accomodation.aspx
DE	Transportation Solutions	http://deldot.gov/information/business/drc/manuals/utilities_manual_2008_may_5.pdf
	Design Resource Center - Utilities	http://deldot.gov/information/business/drc/utilities.shtml
	Utility Coordination Guidelines	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/180-217106fc55c89a604be8c6b3d5c8a805_DelDOT+Utility+Coordination+Guidelines+-+2015.docx
WV	Accommodation of Utilities on Highway Right-of-Way and Adjustment and	http://www.transportation.wv.gov/highways/engineering/files/ACCOMMODATION_OF_UTILITIES.pdf

	Relocation of Utility Facilities on Highway Projects	
GA	The State Office of Utilities	http://www.dot.ga.gov/PS/Utilities
UT	Utilities and Railroads	http://www.udot.utah.gov/main/f?p=100:pg:0::::V,T:,3508
	Manuals of Instruction	http://www.udot.utah.gov/main/f?p=100:pg:0:::1:T,V:3834
PA	Design Manual Part 5 Utility Relocation	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/26-bcdf872036eb6c98812243d21a8011a1_DM-5.pdf
MO	Utility Procedures	http://epg.modot.mo.gov/index.php?title=Category:643_Utility_Procedures
AL	AL DOT Utilities Manual	http://www.dot.state.al.us/rwweb/doc/proceduralmanuals/ALDOT_Design_utman.pdf
NY	Highway Design Manual Chapter 13: Utilities	https://www.dot.ny.gov/divisions/engineering/design/dqab/hdm/chapter-13
NH	Utility Coordination Process (Documentation)	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/239-091b8fa712cd018aaf57054a55890412_Process+-+Verification.docx
	Utility Coordination Process (Relocation)	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/191-9b73f828c17f871d8efc92a2550dd3cb_Process+-+Relocation.docx
	Utility Coordination Process (Pre-Hearing)	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/239-2a1b42fb358d2c11c00b644550e8eb19_Process+-+Pre-Hearing.docx
	Utility Coordination Process (Final Documents)	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/107-a466e544ab5b71f49e471046e7156211_Process+-+Final+Documents.docx
	Utility Coordination Process (Construction)	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/191-56faf9d6ef90097d4a6a97d144c2fe84_Process+-+Construction.docx

AK	Statewide Design and Engineering Services> Publications	http://www.dot.state.ak.us/stwddes/dcspubs/index.shtml#
MN	Utility Accommodation and Coordination Manual	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/107-4d625e1a379a62f760eb59c289c76f9e_Utility+Manual.pdf
ME	MaineDOT Utility Services	http://www.maine.gov/mdot/utilities/
	Utility Accommodation Rules	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/47-2e7c08767997e0407aec17ec348eb459_FINAL2014UtilAcmdnRules.pdf
CT	Public Service Facility Policy and Procedures for Highways in Connecticut	http://www.ct.gov/dot/lib/dot/documents/dutilities/UtilityPolicyProcedures.pdf
NC	Utilities Manuals	https://connect.ncdot.gov/municipalities/Utilities/Pages/UtilitiesManuals.aspx
NM	Requirements for Occupancy of State Highway System Right-of-Way by Utility Facilities	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/107-88df26250860b82a90ff3959ebda09c6_17NMAC++Regs.pdf
MD	Project Utility Coordination Guideline	http://surveygizmoresponseuploads.s3.amazonaws.com/fileuploads/64484/2563290/107-ee0f83db089ce97e657c1e5a9807c1a3_Project+Utility+Coordination+Guideline-3-31-2015.docx
ND	Design Manual Reference and Forms	http://www.dot.nd.gov/manuals/design/designmanual/reference-forms.htm

Appendix H: Multiple Linear Regression Analysis

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	52

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	27	14.56356861	0.53939143	9.60	<.0001
Error	24	1.34829036	0.05617877		
Corrected Total	51	15.91185897			

R-Square	Coeff Var	Root MSE	Risk Mean
0.915265	13.61886	0.237021	1.740385

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Dist	1	0.43163014	0.43163014	7.68	0.0106
Type	9	8.58387585	0.95376398	16.98	<.0001
Length	1	0.11126939	0.11126939	1.98	0.1721
Route	5	1.16920222	0.23384044	4.16	0.0073
Phase	1	1.70278406	1.70278406	30.31	<.0001
Fund	8	1.08913014	0.13614127	2.42	0.0447
ROW	1	0.02230266	0.02230266	0.40	0.5346
U	1	1.45337416	1.45337416	25.87	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dist	1	0.00463371	0.00463371	0.08	0.7764
Type	8	1.93719649	0.24214956	4.31	0.0025
Length	1	0.04362624	0.04362624	0.78	0.3869
Route	4	0.19055251	0.04763813	0.85	0.5088
Phase	1	0.03318491	0.03318491	0.59	0.4496
Fund	8	0.49757330	0.06219666	1.11	0.3929
ROW	1	0.00088915	0.00088915	0.02	0.9009
U	1	1.45337416	1.45337416	25.87	<.0001

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	1.080544700	B	0.42524377	2.54	0.0179
Dist	-0.004664648		0.01624203	-0.29	0.7764
Type BRIDGE REPLACEMENT(P)	0.444184298	B	0.28657395	1.55	0.1342

Type DESIGN ENGINEERING(O)	0.128895781	B	0.33716534	0.38	0.7056
Type I-CHANGE RECONST(O)	0.079897285	B	0.34002368	0.23	0.8162
Type MAJOR WIDENING(O)	0.142980468	B	0.25590286	0.56	0.5815
Type MINOR WIDENING(O)	1.120521357	B	0.27959192	4.01	0.0005
Type NEW INTERCHANGE(O)	-0.072844257	B	0.29589205	-0.25	0.8076
Type RECONSTRUCTION(O)	0.663141146	B	0.17117516	3.87	0.0007
Type SAFETY(P)	0.063727441	B	0.22844701	0.28	0.7827
Type SAFETY-HAZARD ELIM(P)	0.291093003	B	0.51472183	0.57	0.5770
Type SPOT IMPROVEMENTS(O)	0.000000000	B	.	.	.
Length	0.036506312		0.04142668	0.88	0.3869
Route CR	-0.767764014	B	0.60179937	-1.28	0.2142
Route CS	-0.849314538	B	0.53571886	-1.59	0.1260
Route EB	-0.341459039	B	0.48178625	-0.71	0.4853
Route I	-0.220751707	B	0.42824992	-0.52	0.6109
Route JC	0.000000000	B	.	.	.
Route KY	-0.248586048	B	0.18177673	-1.37	0.1841
Route US	0.000000000	B	.	.	.
Phase	0.000000106		0.00000014	0.77	0.4496
Fund BRO	-0.379455987	B	0.39847023	-0.95	0.3504
Fund BRX	-0.287031475	B	0.37157399	-0.77	0.4474
Fund BRZ	0.173445273	B	0.47037953	0.37	0.7156
Fund NH	0.017087659	B	0.39373281	0.04	0.9657
Fund SB2	0.260515404	B	0.37605530	0.69	0.4951
Fund SLO	0.703945610	B	0.50521932	1.39	0.1763
Fund SLX	-0.009528818	B	0.59633286	-0.02	0.9874
Fund SPB	0.000000000	B	.	.	.
Fund SPP	-0.038964876	B	0.34505696	-0.11	0.9110
Fund STP	0.000000000	B	.	.	.
ROW	0.000749251		0.00595560	0.13	0.9009
U	0.147855190		0.02906926	5.09	<.0001

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	52

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	26	14.56267946	0.56010306	10.38	<.0001
Error	25	1.34917952	0.05396718		
Corrected Total	51	15.91185897			

R-Square	Coeff Var	Root MSE	Risk Mean
0.915209	13.34811	0.232308	1.740385

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Dist	1	0.43163014	0.43163014	8.00	0.0091
Type	9	8.58387585	0.95376398	17.67	<.0001
Length	1	0.11126939	0.11126939	2.06	0.1634
Route	5	1.16920222	0.23384044	4.33	0.0056
Phase	1	1.70278406	1.70278406	31.55	<.0001
Fund	8	1.08913014	0.13614127	2.52	0.0366
U	1	1.47478766	1.47478766	27.33	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dist	1	0.00397030	0.00397030	0.07	0.7884
Type	8	1.98496925	0.24812116	4.60	0.0015
Length	1	0.05682925	0.05682925	1.05	0.3146
Route	4	0.19370692	0.04842673	0.90	0.4803
Phase	1	0.08643359	0.08643359	1.60	0.2173
Fund	8	0.50712692	0.06339087	1.17	0.3525
U	1	1.47478766	1.47478766	27.33	<.0001

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	1.071661253	B	0.41100324	2.61	0.0152
Dist	-0.004209214		0.01551867	-0.27	0.7884
Type BRIDGE REPLACEMENT(P)	0.451506612	B	0.27502252	1.64	0.1132
Type DESIGN ENGINEERING(O)	0.108135178	B	0.28817612	0.38	0.7106
Type I-CHANGE RECONST(O)	0.070513754	B	0.32514675	0.22	0.8301

Type MAJOR WIDENING(O)	0.139668182	B	0.24948423	0.56	0.5806
Type MINOR WIDENING(O)	1.124063154	B	0.27264058	4.12	0.0004
Type NEW INTERCHANGE(O)	-0.071943142	B	0.28992441	-0.25	0.8060
Type RECONSTRUCTION(O)	0.659929343	B	0.16589556	3.98	0.0005
Type SAFETY(P)	0.053524887	B	0.20932194	0.26	0.8003
Type SAFETY-HAZARD ELIM(P)	0.306054571	B	0.49083831	0.62	0.5386
Type SPOT IMPROVEMENTS(O)	0.000000000	B	.	.	.
Length	0.038499236		0.03751725	1.03	0.3146
Route CR	-0.761817861	B	0.58801300	-1.30	0.2070
Route CS	-0.842076384	B	0.52203135	-1.61	0.1193
Route EB	-0.316313482	B	0.42965425	-0.74	0.4685
Route I	-0.210068256	B	0.41140087	-0.51	0.6141
Route JC	0.000000000	B	.	.	.
Route KY	-0.256208655	B	0.16797426	-1.53	0.1397
Route US	0.000000000	B	.	.	.
Phase	0.000000119		0.00000009	1.27	0.2173
Fund BRO	-0.370844319	B	0.38474239	-0.96	0.3443
Fund BRX	-0.277616141	B	0.35672317	-0.78	0.4437
Fund BRZ	0.168483220	B	0.45940425	0.37	0.7169
Fund NH	0.007145192	B	0.37805129	0.02	0.9851
Fund SB2	0.286540034	B	0.30780311	0.93	0.3608
Fund SLO	0.688075080	B	0.47949013	1.44	0.1637
Fund SLX	0.030830799	B	0.49269396	0.06	0.9506
Fund SPB	0.000000000	B	.	.	.
Fund SPP	-0.023066533	B	0.31469983	-0.07	0.9422
Fund STP	0.000000000	B	.	.	.
U	0.147316645		0.02818071	5.23	<.0001

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	53

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	25	14.56965228	0.58278609	11.17	<.0001
Error	27	1.40833514	0.05216056		
Corrected Total	52	15.97798742			

R-Square	Coeff Var	Root MSE	Risk Mean
0.911858	13.08595	0.228387	1.745283

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Dist	1	0.35540926	0.35540926	6.81	0.0146
Type	9	8.70771288	0.96752365	18.55	<.0001
Route	5	1.11436032	0.22287206	4.27	0.0054
Phase	1	1.84499231	1.84499231	35.37	<.0001
Fund	8	1.09398741	0.13674843	2.62	0.0289
U	1	1.45319010	1.45319010	27.86	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dist	1	0.01011472	0.01011472	0.19	0.6632
Type	8	2.09918280	0.26239785	5.03	0.0007
Route	4	0.16141449	0.04035362	0.77	0.5519
Phase	1	0.17844836	0.17844836	3.42	0.0753
Fund	8	0.65797616	0.08224702	1.58	0.1784
U	1	1.45319010	1.45319010	27.86	<.0001

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	1.038188913	B	0.40105601	2.59	0.0153
Dist	-0.006478277		0.01471139	-0.44	0.6632
Type BRIDGE REPLACEMENT(P)	0.443897974	B	0.26029439	1.71	0.0996
Type DESIGN ENGINEERING(O)	0.260768507	B	0.24396029	1.07	0.2946
Type I-CHANGE RECONST(O)	0.107320863	B	0.31492535	0.34	0.7359
Type MAJOR WIDENING(O)	0.143764568	B	0.19567518	0.73	0.4688
Type MINOR WIDENING(O)	1.146519446	B	0.26383454	4.35	0.0002

Type NEW INTERCHANGE(O)	-0.027342163	B	0.28073837	-0.10	0.9231
Type RECONSTRUCTION(O)	0.677465563	B	0.16046272	4.22	0.0002
Type SAFETY(P)	0.053030261	B	0.20559460	0.26	0.7984
Type SAFETY-HAZARD ELIM(P)	0.391078306	B	0.47424524	0.82	0.4168
Type SPOT IMPROVEMENTS(O)	0.000000000	B	.	.	.
Route CR	-0.716465443	B	0.56547238	-1.27	0.2160
Route CS	-0.812037997	B	0.50138480	-1.62	0.1169
Route EB	-0.326257287	B	0.42085083	-0.78	0.4449
Route I	0.015359680	B	0.34260357	0.04	0.9646
Route JC	0.000000000	B	.	.	.
Route KY	-0.190725550	B	0.15257323	-1.25	0.2220
Route US	0.000000000	B	.	.	.
Phase	0.000000156		0.00000008	1.85	0.0753
Fund BRO	-0.335599930	B	0.35505393	-0.95	0.3529
Fund BRX	-0.266505225	B	0.33397811	-0.80	0.4318
Fund BRZ	0.196770073	B	0.45067138	0.44	0.6659
Fund NH	0.053578315	B	0.35106620	0.15	0.8798
Fund SB2	0.332235039	B	0.29903298	1.11	0.2764
Fund SLO	0.706999630	B	0.46865154	1.51	0.1430
Fund SLX	0.196203594	B	0.43359719	0.45	0.6545
Fund SPB	0.000000000	B	.	.	.
Fund SPP	0.022953123	B	0.29842028	0.08	0.9393
Fund STP	0.000000000	B	.	.	.
U	0.137004386		0.02595640	5.28	<.0001

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	53

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	17	13.91167612	0.81833389	13.86	<.0001
Error	35	2.06631130	0.05903747		
Corrected Total	52	15.97798742			

R-Square	Coeff Var	Root MSE	Risk Mean
0.870678	13.92188	0.242976	1.745283

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Dist	1	0.35540926	0.35540926	6.02	0.0193
Type	9	8.70771288	0.96752365	16.39	<.0001
Route	5	1.11436032	0.22287206	3.78	0.0077
Phase	1	1.84499231	1.84499231	31.25	<.0001
U	1	1.88920135	1.88920135	32.00	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dist	1	0.13975700	0.13975700	2.37	0.1329
Type	8	2.36382242	0.29547780	5.00	0.0003
Route	5	0.49477353	0.09895471	1.68	0.1662
Phase	1	0.29126342	0.29126342	4.93	0.0329
U	1	1.88920135	1.88920135	32.00	<.0001

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	1.327093361	B	0.20819162	6.37	<.0001
Dist	-0.018877924		0.01226963	-1.54	0.1329
Type BRIDGE REPLACEMENT(P)	-0.006489487	B	0.15498904	-0.04	0.9668
Type DESIGN ENGINEERING(O)	0.365851415	B	0.24328981	1.50	0.1416
Type I-CHANGE RECONST(O)	-0.132353131	B	0.31159860	-0.42	0.6736
Type MAJOR WIDENING(O)	0.119675773	B	0.18478240	0.65	0.5214
Type MINOR WIDENING(O)	0.798894353	B	0.22895650	3.49	0.0013
Type NEW INTERCHANGE(O)	-0.148174085	B	0.28608305	-0.52	0.6078
Type RECONSTRUCTION(O)	0.563590526	B	0.15833208	3.56	0.0011

Type SAFETY(P)	-0.063998952	B	0.20485898	-0.31	0.7566
Type SAFETY-HAZARD ELIM(P)	0.166845812	B	0.32775095	0.51	0.6139
Type SPOT IMPROVEMENTS(O)	0.000000000	B	.	.	.
Route CR	-0.286337661	B	0.15042112	-1.90	0.0652
Route CS	-0.448423998	B	0.17838937	-2.51	0.0167
Route EB	-0.283335123	B	0.34391189	-0.82	0.4156
Route I	-0.135787962	B	0.30603468	-0.44	0.6600
Route JC	0.000000000	B	.	.	.
Route KY	-0.184490979	B	0.12368150	-1.49	0.1447
Route US	0.000000000	B	.	.	.
Phase	0.000000156		0.00000007	2.22	0.0329
U	0.132481166		0.02341957	5.66	<.0001

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	53

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	12	13.41690258	1.11807522	17.46	<.0001
Error	40	2.56108484	0.06402712		
Corrected Total	52	15.97798742			

R-Square	Coeff Var	Root MSE	Risk Mean
0.839712	14.49827	0.253036	1.745283

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Dist	1	0.35540926	0.35540926	5.55	0.0235
Type	9	8.70771288	0.96752365	15.11	<.0001
Phase	1	2.16688641	2.16688641	33.84	<.0001
U	1	2.18689403	2.18689403	34.16	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dist	1	0.22115022	0.22115022	3.45	0.0705
Type	9	2.36670446	0.26296716	4.11	0.0009
Phase	1	0.59486889	0.59486889	9.29	0.0041
U	1	2.18689403	2.18689403	34.16	<.0001

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	1.140927859	B	0.18227852	6.26	<.0001
Dist	-0.021741238		0.01169829	-1.86	0.0705
Type BRIDGE REPLACEMENT(P)	-0.002595937	B	0.15261635	-0.02	0.9865
Type DESIGN ENGINEERING(O)	0.451582082	B	0.24073275	1.88	0.0680
Type I-CHANGE RECONST(O)	-0.091388891	B	0.24041898	-0.38	0.7059
Type MAJOR WIDENING(O)	0.134792867	B	0.17153768	0.79	0.4366
Type MINOR WIDENING(O)	0.680695917	B	0.22150735	3.07	0.0038
Type NEW INTERCHANGE(O)	-0.115091825	B	0.29342795	-0.39	0.6970
Type RECONSTRUCTION(O)	0.581991937	B	0.16425443	3.54	0.0010
Type SAFETY(P)	0.074214340	B	0.18863268	0.39	0.6961
Type SAFETY-HAZARD ELIM(P)	0.357163353	B	0.30527308	1.17	0.2489

Type SPOT IMPROVEMENTS(O)	0.000000000	B	.	.	.
Phase	0.000000188		0.00000006	3.05	0.0041
U	0.129748133		0.02220083	5.84	<.0001

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	53

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	13.19575236	1.19961385	17.68	<.0001
Error	41	2.78223506	0.06785939		
Corrected Total	52	15.97798742			

R-Square	Coeff Var	Root MSE	Risk Mean
0.825871	14.92585	0.260498	1.745283

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Type	9	8.52279562	0.94697729	13.95	<.0001
Phase	1	2.70605698	2.70605698	39.88	<.0001
U	1	1.96689975	1.96689975	28.98	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Type	9	2.19336263	0.24370696	3.59	0.0023
Phase	1	1.32779642	1.32779642	19.57	<.0001
U	1	1.96689975	1.96689975	28.98	<.0001

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	0.9411783194	B	0.15156171	6.21	<.0001
Type BRIDGE REPLACEMENT(P)	0.0953733377	B	0.14744740	0.65	0.5213
Type DESIGN ENGINEERING(O)	0.6010749907	B	0.23358822	2.57	0.0138
Type I-CHANGE RECONST(O)	0.0842184414	B	0.22759256	0.37	0.7133
Type MAJOR WIDENING(O)	0.1702300659	B	0.17550227	0.97	0.3378
Type MINOR WIDENING(O)	0.6889415295	B	0.22799431	3.02	0.0043
Type NEW INTERCHANGE(O)	-.08341 46545	B	0.30157167	-0.28	0.7835
Type RECONSTRUCTION(O)	0.5822210406	B	0.16909859	3.44	0.0013
Type SAFETY(P)	0.1780517021	B	0.18548190	0.96	0.3427
Type SAFETY-HAZARD ELIM(P)	0.5283506512	B	0.29962867	1.76	0.0853
Type SPOT IMPROVEMENTS(O)	0.0000000000	B	.	.	.
Phase	0.0000002440		0.00000006	4.42	<.0001
U	0.1175334055		0.02183108	5.38	<.0001

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	53

The SAS System

The GLM Procedure

Dependent Variable: Risk

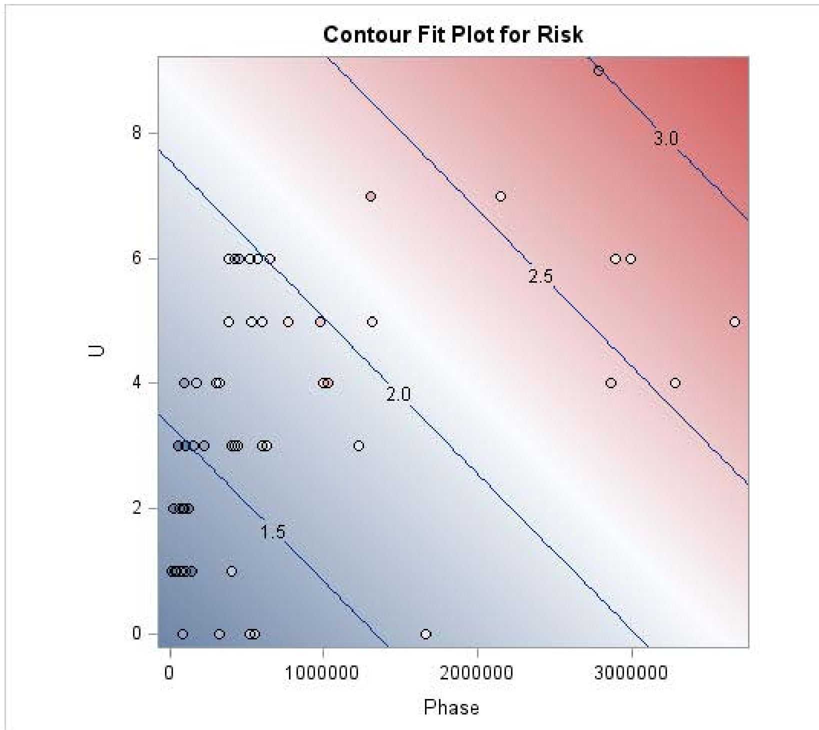
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	2	11.00238973	5.50119487	55.28	<.0001
Error	50	4.97559769	0.09951195		
Corrected Total	52	15.97798742			

R-Square	Coeff Var	Root MSE	Risk Mean
0.688597	18.07473	0.315455	1.745283

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Phase	1	8.42157587	8.42157587	84.63	<.0001
U	1	2.58081386	2.58081386	25.93	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Phase	1	3.11442265	3.11442265	31.30	<.0001
U	1	2.58081386	2.58081386	25.93	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1.104423827	0.08310485	13.29	<.0001
Phase	0.000000296	0.00000005	5.59	<.0001
U	0.118130467	0.02319643	5.09	<.0001


Contour Fit Plot for Risk
3.0
2.5
2.0
1.5
U
0
2
4
6
8
0
1000000
2000000
3000000
Phase

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	53

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	3	11.05019812	3.68339937	36.63	<.0001
Error	49	4.92778930	0.10056713		
Corrected Total	52	15.97798742			

R-Square	Coeff Var	Root MSE	Risk Mean
0.691589	18.17030	0.317123	1.745283

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Dist	1	0.35540926	0.35540926	3.53	0.0661
Phase	1	8.07601858	8.07601858	80.30	<.0001
U	1	2.61877027	2.61877027	26.04	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dist	1	0.04780839	0.04780839	0.48	0.4938
Phase	1	2.61519444	2.61519444	26.00	<.0001
U	1	2.61877027	2.61877027	26.04	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1.149911878	0.10645293	10.80	<.0001
Dist	-0.008266472	0.01198936	-0.69	0.4938
Phase	0.000000284	0.00000006	5.10	<.0001
U	0.121331666	0.02377680	5.10	<.0001

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	53

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	9	11.54785370	1.28309486	12.45	<.0001
Error	43	4.43013372	0.10302637		
Corrected Total	52	15.97798742			

R-Square	Coeff Var	Root MSE	Risk Mean
0.722735	18.39113	0.320977	1.745283

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Dist	1	0.35540926	0.35540926	3.45	0.0701
Route	6	3.16829690	0.52804948	5.13	0.0005
Phase	1	5.84626924	5.84626924	56.75	<.0001
U	1	2.17787830	2.17787830	21.14	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dist	1	0.02264849	0.02264849	0.22	0.6415
Route	6	0.49765558	0.08294260	0.81	0.5716
Phase	1	1.74489408	1.74489408	16.94	0.0002
U	1	2.17787830	2.17787830	21.14	<.0001

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	1.314972918	B	0.13841822	9.50	<.0001
Dist	-0.006631095		0.01414294	-0.47	0.6415
Route CR	-0.320196759	B	0.17592977	-1.82	0.0757
Route CS	-0.262755482	B	0.21259889	-1.24	0.2232
Route EB	-0.417174260	B	0.33964234	-1.23	0.2260
Route I	-0.009583635	B	0.34271412	-0.03	0.9778
Route JC	-0.141344080	B	0.33890269	-0.42	0.6787
Route KY	-0.127825889	B	0.13367025	-0.96	0.3443
Route US	0.000000000	B	.	.	.
Phase	0.000000254		0.00000006	4.12	0.0002
U	0.115684249		0.02516122	4.60	<.0001

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The SAS System

The GLM Procedure

Class Level Information		
Class	**Levels**	**Values**
Type	10	BRIDGE REPLACEMENT(P) DESIGN ENGINEERING(O) I-CHANGE RECONST(O) MAJOR WIDENING(O) MINOR WIDENING(O) NEW INTERCHANGE(O) RECONSTRUCTION(O) SAFETY(P) SAFETY-HAZARD ELIM(P) SPOT IMPROVEMENTS (O)
Route	7	CR CS EB I JC KY US
Fund	10	BRO BRX BRZ NH SB2 SLO SLX SPB SPP STP

Number of Observations Read	1966
Number of Observations Used	53

The SAS System

The GLM Procedure

Dependent Variable: Risk

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	17	12.47046947	0.73355703	7.32	<.0001
Error	35	3.50751795	0.10021480		
Corrected Total	52	15.97798742			

R-Square	Coeff Var	Root MSE	Risk Mean
0.780478	18.13845	0.316567	1.745283

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Dist	1	0.35540926	0.35540926	3.55	0.0680
Route	6	3.16829690	0.52804948	5.27	0.0006
Fund	8	5.19794032	0.64974254	6.48	<.0001
Phase	1	2.18681585	2.18681585	21.82	<.0001
U	1	1.56200714	1.56200714	15.59	0.0004

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dist	1	0.03625271	0.03625271	0.36	0.5514
Route	5	0.19480509	0.03896102	0.39	0.8531
Fund	8	0.92261578	0.11532697	1.15	0.3556
Phase	1	0.65652350	0.65652350	6.55	0.0150
U	1	1.56200714	1.56200714	15.59	0.0004

Parameter	Estimate		Standard Error	t Value	Pr > |t|
Intercept	1.573413127	B	0.27927739	5.63	<.0001
Dist	-0.010893497		0.01811186	-0.60	0.5514
Route CR	-0.037342302	B	0.55704535	-0.07	0.9469
Route CS	-0.168898269	B	0.43445306	-0.39	0.6998
Route EB	-0.419892416	B	0.37859514	-1.11	0.2750
Route I	0.006864994	B	0.39025021	0.02	0.9861
Route JC	-0.196331819	B	0.35352452	-0.56	0.5822
Route KY	-0.067956892	B	0.16143178	-0.42	0.6764
Route US	0.000000000	B	.	.	.

Fund BRO	-0.419166797	B	0.28416896	-1.48	0.1491
Fund BRX	-0.397752693	B	0.29123064	-1.37	0.1807
Fund BRZ	-0.503722115	B	0.45750181	-1.10	0.2784
Fund NH	-0.214021696	B	0.29550208	-0.72	0.4737
Fund SB2	-0.008984226	B	0.25909442	-0.03	0.9725
Fund SLO	-0.285038319	B	0.49770791	-0.57	0.5705
Fund SLX	-0.059554624	B	0.42700656	-0.14	0.8899
Fund SPB	0.000000000	B	.	.	.
Fund SPP	-0.155058589	B	0.26058776	-0.60	0.5556
Fund STP	0.000000000	B	.	.	.
Phase	0.000000200		0.00000008	2.56	0.0150
U	0.111929682		0.02835109	3.95	0.0004

Note: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

Appendix I: Redacted KYTC Data for Regression Analysis

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
ROCKFALL MITIGTN(P)	0.4	$225,000	2/27/2007			8/1/2009	0	0		0	0		0	0	
BRIDGE REHAB(P)		$65,000	8/29/2012	$65,000	3/22/2012	6/10/2013									
ROCKFALL MITIGTN(P)	1	$105,000	4/11/2012	$200,000	11/7/2011	6/15/2013	3	3		3	0		3	3	
MINOR WIDENING(O)	0.1	$80,000	6/10/2012	$75,000	12/20/2007	7/1/2013	0	0		0	0		0	0	
RECONSTRUCTION(O)	2.1	$2,190,000	3/24/2011	$2,100,000	10/26/2009	7/15/2013	1	1		1	0		1	0	10/1/2012
MAJOR WIDENING(O)	1.981	$2,290,000	6/9/2011	$1,860,000	11/10/2009	7/15/2013	10	10	11/16/2011	10	10	2/15/2013	10	0	7/15/2013
BRIDGE REPLACEMENT(P)	0.1	$75,000	2/7/2013			8/1/2013									
BRIDGE REPLACEMENT(P)	0.1	$75,000	2/26/2013			8/1/2013									
SPOT IMPROVEMENTS(O)		$235,000	3/4/2014	$170,000	11/22/2011	8/2/2013									
CONTINGNCY ACCOUNT(O)		$25,000	8/22/2012			8/30/2013									
SPOT IMPROVEMENTS(O)	0.36	$220,000	9/13/2012	$220,000	6/25/2012	8/30/2013	4	4	10/17/2013	4	2	5/15/2013	4	0	8/15/2013
BRIDGE REPLACEMENT(P)	0.01	$150,000	2/6/2013	$160,000	11/18/2011	8/30/2013									
BRIDGE REPLACEMENT(P)		$105,000	1/23/2013	$105,000	11/10/2011	8/30/2013									
BRIDGE REPLACEMENT(P)	0.1	$161,204	11/20/2012	$250,000	11/2/2007	8/30/2013				1	1		1	0	
MAJOR WIDENING(O)	5.5	$200,000	7/16/2013	$750,000	11/21/2011	9/1/2013									
RECONSTRUCTION(O)	0.4	$974,500	1/9/2014	$630,000	11/2/2009	9/1/2013	5	0							
BRIDGE REPLACEMENT(P)	0.1	$25,000	7/2/2013	$25,000	6/18/2012	9/15/2013	2	2		2	1		2	1	
BRIDGE REPLACEMENT(P)	0.1	$225,000	9/14/2012	$225,000	8/12/2011	9/30/2013	3	0		3	0		3	0	10/1/2013
SPOT IMPROVEMENTS(O)	4.41	$2,800,000	4/12/2010	$2,500,000	10/30/2009	9/30/2013	6	6	10/12/2010	6	5	3/15/2013	6	0	8/15/2013
SAFETY-HAZARD ELIM(P)		$4,000	10/25/2013			10/10/2013									
BRIDGE REPLACEMENT(P)	0.1	$25,000	3/26/2013			10/15/2013									
SPOT IMPROVEMENTS(O)	0.1	$90,000	1/8/2013	$90,000	12/12/2012	10/15/2013	2	2		2	2		2	2	10/15/2013
SPOT IMPROVEMENTS(O)	0.1	$60,000	1/8/2013	$60,000	12/12/2012	10/15/2013	2	2		2	2		2	2	10/15/2013
MAJOR WIDENING(O)	2.9	$4,000,000	1/3/2006			10/30/2013	0	0		0	0		0	0	1/1/2012
BRIDGE REPLACEMENT(P)	0.1	$30,000	11/2/2012	$40,000	4/20/2012	10/30/2013	1	1	12/14/2013	1	1	7/10/2013	1	1	10/30/2013
SAFETY-HAZARD ELIM(P)	0.2	$620,000	2/25/2013	$615,000	11/28/2011	11/1/2013		0							

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)		$150,000	3/14/2013	$100,000	4/23/2012	11/1/2013		0							
BIKE/PED FACIL(O)		$60,000	5/7/2013			11/15/2013									
BRIDGE REPLACEMENT(P)	0.1	$660,000	1/9/2014	$255,000	3/18/2010	11/15/2013		0							
BRIDGE REPLACEMENT(P)	0.1	$75,000	12/10/2012	$75,000	12/13/2012	11/15/2013									
BRIDGE REPLACEMENT(P)	0.1	$200,000	12/10/2012			11/15/2013									
BRIDGE REPLACEMENT(P)	0.1	$175,000	6/15/2012	$150,000	11/28/2011	11/29/2013	4	0		4	0		0	0	
SAFETY-HAZARD ELIM(P)	0.063	$96,000	6/25/2013			11/30/2013	4	4	7/15/2013	1	0	10/30/2013	1	0	11/30/2013
BRIDGE REPLACEMENT(P)	0.1	$129,200	8/8/2013	$275,000	11/23/2011	12/1/2013									
BRIDGE REPLACEMENT(P)	0.1	$75,000	2/20/2013			12/15/2013									
BRIDGE REPLACEMENT(P)	0.1	$1,480,000	10/29/2007			1/1/2014	4	4		4	4		4	0	
BRIDGE REPLACEMENT(P)	0.1	$100,000	1/23/2013	$90,000	4/20/2012	1/6/2014	1	1	2/15/2013	1	1	8/13/2013	1	1	1/6/2014
BRIDGE REPLACEMENT(P)	0.1	$144,000	11/5/2013			1/31/2014	1	0		1	0				
I-CHANGE RECONST(O)	0.5	$400,000	9/16/2013	$350,000	11/13/2007	2/28/2014	3	3		3	2		3	0	
BRIDGE REPLACEMENT(P)	0.245	$385,000	11/2/2012	$130,000	6/29/2012	2/28/2014	6	6	12/19/2012	3	3	12/13/2013	3	1	2/28/2014
SAFETY(P)	0.1	$300,000	10/30/2013	$250,000	11/23/2011	2/28/2014									
BRIDGE REPLACEMENT(P)	0.1	$300,000	9/14/2012	$300,000	8/12/2011	3/1/2014	4	0		4	0		4	0	10/1/2013
BRIDGE REPLACEMENT(P)	0.1	$97,500	5/2/2013			3/1/2014									
BRIDGE REPLACEMENT(P)	0.1	$450,000	10/25/2013			3/15/2014	6	6		6	6		6	5	3/15/2014
BRIDGE REPLACEMENT(P)	0.1	$150,000	2/26/2013			3/16/2014	3	3		3	1		3	2	3/16/2014
SAFETY(P)	1.2	$760,000	6/28/2010	$1,000,000	10/26/2009	3/30/2014	5	0		5	0		5	0	11/1/2012
DESIGN ENGINEERING(O)	0.4	$1,300,000	6/10/2012	$1,300,000	12/27/2011	3/30/2014	7	7	7/18/2012	7	7	9/25/2013	7	1	3/31/2014
SAFETY(P)	0.756	$370,000	9/13/2012	$405,000	1/17/2012	3/31/2014									
BRIDGE REPLACEMENT(P)	0.1	$175,000	12/18/2013			3/31/2014									
MAJOR WIDENING(O)	6.2	$250,000	7/16/2013	$750,000	11/21/2011	4/1/2014									
SAFETY(P)	0.18	$250,000	3/4/2014			4/1/2014									
MAJOR WIDENING(O)	0.9	$591,500	11/11/2013			4/15/2014	4	4	2/1/2012	3	3	7/31/2013	3	0	4/15/2014

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
I-CHANGE RECONST(O)		$430,000	12/12/2012	$390,000	11/18/2011	4/20/2014									
BRIDGE REPLACEMENT(P)	0.1	$120,000	5/21/2013	$120,000	3/5/2013	4/25/2014	2	2	6/19/2013	2	1	2/28/2014	2	0	4/25/2014
BRIDGE REPLACEMENT(P)	0.67	$440,000	8/13/2012	$440,000	3/9/2012	4/30/2014	3	3	9/13/2012	3	1	1/2/2014	3	1	4/30/2014
SAFETY(P)	0.5	$610,000	9/1/2011	$390,000	10/26/2009	4/30/2014									
RELOCATION(O)	2.7	$1,500,000	4/11/2002			4/30/2014	4	4		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	8/8/2013	$100,000	11/23/2011	4/30/2014									
BRIDGE REPLACEMENT(P)	0.1	$160,000	8/21/2013	$100,000	11/23/2011	4/30/2014									
BRIDGE REPLACEMENT(P)	1.2	$520,000	3/14/2013	$500,000	3/1/2011	5/1/2014	0	0		0	0		0	0	4/1/2010
RECONSTRUCTION(O)	0.41	$680,000	8/27/2013			5/1/2014	4	4		4	3		4	0	
NEW ROUTE(O)		$50,000	7/24/2013			5/1/2014									
MINOR WIDENING(O)	0.5	$60,000	4/23/2013			5/1/2014	4	4		4	1		4	2	
SAFETY(P)	0.2	$45,000	5/13/2013			5/1/2014	1	1		1	1		1	0	5/1/2014
MAJOR WIDENING(O)		$600,000	10/23/2012	$600,000	11/28/2011	5/1/2014	5	5		5	1		5	0	
MINOR WIDENING(O)	4.318	$1,579,600	12/5/2013	$2,810,000	11/13/2007	5/15/2014	6	6		6	6		6	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	4/1/2013			5/15/2014	1	1		0	0		0	0	
BRIDGE REPLACEMENT(P)		$50,000	2/18/2014	$50,000	11/18/2011	5/15/2014									
BRIDGE REPLACEMENT(P)	0.04	$30,000	12/18/2013	$40,000	11/4/2013	5/15/2014									
BRIDGE REPLACEMENT(P)	0.1	$430,000	7/19/2012	$430,000	7/11/2011	5/15/2014									
BRIDGE REPLACEMENT(P)	0.1	$15,000	6/5/2013	$20,000	3/8/2012	5/30/2014	1	1		1	1		1	0	5/30/2014
BRIDGE REPLACEMENT(P)	0.1	$320,000	11/2/2012	$400,000	11/17/2011	6/1/2014	4	4	12/1/2013	5	4	2/1/2014	4	0	6/1/2014
SAFETY-HAZARD ELIM(P)	0.6	$170,000	9/20/2012	$150,000	11/13/2007	6/1/2014									
MAJOR WIDENING(O)	5.6	$2,450,000	11/11/2013			6/1/2014									
BRIDGE REPLACEMENT(P)	0.1	$270,000	7/3/2012	$270,000	11/23/2011	6/1/2014				5	0				
BRIDGE REPLACEMENT(P)	0.016	$37,000	3/4/2014			6/1/2014	0	0							
SAFETY(P)	0.1	$1,309,999	6/15/2010			6/15/2014									
DESIGN ENGINEERING(O)	0.45	$750,000	7/26/2013	$2,000,000	11/22/2011	6/15/2014									

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RECONSTRUCTION(O)	1.4	$780,000	12/5/2010	$650,000	11/2/2007	6/15/2014									
SAFETY-HAZARD ELIM(P)	1.029	$450,000	2/13/2012			6/15/2014				4	0				
SAFETY(P)	0.7	$494,000	2/25/2013			6/30/2014									
SAFETY(P)	0.4	$205,000	7/15/2013			6/30/2014									
SAFETY(P)	0.1	$45,000	2/3/2014			6/30/2014									
BRIDGE REPLACEMENT(P)	0.1	$90,000	7/1/2013	$95,000	3/1/2012	6/30/2014	4	4		3	2		4	0	6/30/2014
BRIDGE REPLACEMENT(P)	0.153	$100,000	11/14/2013			6/30/2014	3	3		3	0		3	0	
RECONSTRUCTION(O)	2.4	$775,000	4/11/2012	$600,000	12/20/2007	6/30/2014	3	3		3	1		3	1	
SAFETY(P)	0.7	$1,750,000	12/5/2010	$300,000	11/2/2007	6/30/2014	0	0		5	1		0	0	
RECONSTRUCTION(O)	1	$975,000	12/18/2013			6/30/2014									
RECONSTRUCTION(O)	0.7	$800,000	5/8/2013			7/1/2014									
NEW ROUTE(O)		$1,570,000	10/30/2012			7/1/2014	5	5		3	3		5	2	
SAFETY(P)	0.23	$400,000	4/28/2013			7/1/2014	1	1		1	1		1	0	
RECONSTRUCTION(O)	1.273	$350,000	2/1/2012	$425,000	10/4/2010	7/1/2014									
SPOT IMPROVEMENTS(O)	4.198	$235,000	12/10/2013	$125,000	1/1/2013	7/1/2014									
MAJOR WIDENING(O)	3.5	$2,300,000	12/15/2010	$2,295,000	8/9/2010	7/1/2014	7	5		7	5		7	2	
NEW ROUTE(O)	3	$1,250,000	1/11/2012			7/13/2014	6	6	2/2/2012	6	2		6	0	
SAFETY-HAZARD ELIM(P)	0.753	$1,000,000	5/14/2012			7/15/2014									
BRIDGE REPLACEMENT(P)	0.1	$160,000	1/24/2012	$160,000	11/23/2011	7/25/2014				1	0				
BRIDGE REPLACEMENT(P)	0.6	$550,000	4/1/2013	$500,000	3/1/2011	7/30/2014	0	0		0	0		0	0	5/1/2011
DESIGN ENGINEERING(O)	8.3	$770,000	8/24/2012	$770,000	6/29/2012	7/30/2014	5	5	9/25/2013	5	1	11/30/2013	5	0	3/30/2014
BRIDGE REPLACEMENT(P)	0.1	$380,000	7/19/2012	$225,000	11/4/2011	7/30/2014	5	4		5	3		5	2	7/30/2014
BRIDGE REPLACEMENT(P)	0.1	$420,000	6/12/2012	$420,000	11/3/2011	7/30/2014	3	3		3	2		3	1	7/30/2014
RECONSTRUCTION(O)	2	$550,000	3/22/2011			7/30/2014	4	4		3	1		3	0	7/30/2014
NEW INTERCHANGE(O)	1.4	$425,000	9/3/2013	$200,000	3/28/2013	8/1/2014	6	6		6	0		6	0	
RECONSTRUCTION(O)	2.5	$4,800,000	12/2/2013	$750,000	11/2/2007	8/15/2014									

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY(P)		$283,750	5/28/2013			8/15/2014									
RECONSTRUCTION(O)	1.6	$2,679,212	8/16/2013	$1,525,000	2/6/2012	8/15/2014									
MAJOR WIDENING(O)	1	$2,505,000	2/29/2012	$1,875,000	11/22/2011	8/30/2014									
NEW INTERCHANGE(O)		$1,560,000	11/11/2013	$7,750,000	7/25/2011	9/15/2014	13	13	1/18/2013	9	4	5/31/2014	9	0	9/15/2014
BRIDGE REPLACEMENT(P)	0.04	$150,000	2/18/2014	$160,000	11/4/2013	9/15/2014									
MAJOR WIDENING(O)	0.98	$2,185,000	5/20/2009			9/15/2014	4	3		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$280,000	8/26/2013	$175,000	5/4/2012	9/15/2014									
RECONSTRUCTION(O)	0.6	$307,125	1/29/2014			9/15/2014									
RECONSTRUCTION(O)	3	$625,000	2/13/2013	$750,000	12/20/2007	9/15/2014	3	3		3	0		3	0	
SAFETY(P)	0.35	$2,150,000	1/29/2014	$2,000,000	1/10/2013	9/30/2014	7	7	3/26/2013	7	1	1/30/2014	7	0	9/30/2014
SAFETY(P)	0.1	$520,000	9/13/2013	$520,000	8/23/2013	9/30/2014	6	6	10/16/2013	6	0	5/15/2014	6	0	9/30/2014
RECONSTRUCTION(O)	1.323	$1,000,000	4/10/2013	$1,445,000	6/26/2012	9/30/2014	4	4	5/14/2013	4	0	3/30/2014	4	0	9/30/2014
MAJOR WIDENING(O)	1.9	$575,000	8/16/2013	$600,000	3/28/2013	9/30/2014	6	6		6	0		6	0	9/30/2014
SPOT IMPROVEMENTS(O)	3	$1,225,000	2/13/2013	$500,000	12/20/2007	9/30/2014	3	3		3	0		3	0	9/30/2014
I-CHANGE RECONST(O)	1	$600,000	4/10/2013	$1,600,000	10/27/2009	10/1/2014	3	3	11/1/2013	3	2	4/1/2014	3	0	10/1/2014
RECONSTRUCTION(O)	1	$695,000	6/23/2011			10/1/2014									
BRIDGE REPLACEMENT(P)	0.1	$400,000	11/2/2012	$250,000	11/17/2011	10/15/2014									
BRIDGE REPLACEMENT(P)	0.1	$0	8/17/2012			10/25/2014				4	0				
RESURFACING(P)	1	$1,000,000	10/23/2012	$750,000	11/23/2011	10/25/2014									
MAJOR WIDENING(O)	0.709	$2,327,000	2/8/2011			10/30/2014	9	9	4/6/2011	9	3	1/30/2014	9	0	9/30/2014
RECONSTRUCTION(O)	0.4	$275,000	2/2/2010	$0	12/20/2007	10/30/2014									
BRIDGE REPLACEMENT(P)	0.2	$350,000	10/23/2013	$520,000	11/18/2011	10/31/2014									
RECONSTRUCTION(O)		$680,000	1/7/2011	$159,948	12/2/2009	10/31/2014	0	0		0	0		0	0	
RELOCATION(O)	6.4	$1,200,000	6/10/2012	$650,000	11/21/2011	11/1/2014									
NEW INTERCHANGE(O)		$860,000	12/4/2013	$185,000	1/1/2012	11/1/2014									
RECONSTRUCTION(O)	0.9	$1,310,000	4/10/2013	$850,000	11/3/2011	11/1/2014	5	0		5	0		5	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY(P)	1.04	$800,000	10/7/2013			11/15/2014									
BRIDGE REHAB(P)		$100,000	10/31/2013			11/15/2014									
BRIDGE REPLACEMENT(P)	0.1	$189,950	11/21/2013	$150,000	11/22/2011	11/15/2014									
RECONSTRUCTION(O)	1.05	$3,750,000	3/4/2013			11/28/2014	6	5	2/1/2014	9	5	5/1/2014	6	0	11/28/2014
I-CHANGE RECONST(O)	0.751	$920,000	10/27/2010	$850,000	10/26/2007	11/30/2014									
CONGESTION MITIGTN(O)		$72,000	8/12/2013			12/1/2014									
SAFETY(P)	0.4	$100,000	10/23/2013	$500,000	11/16/2011	12/15/2014									
SAFETY-HAZARD ELIM(P)	0.184	$650,000	3/12/2013	$1,200,000	12/27/2011	12/30/2014	6	6	4/10/2013	6	1	5/30/2014	6	0	12/30/2014
MAJOR WIDENING(O)	3	$1,325,000	10/2/2013			12/31/2014	1	1							
MAJOR WIDENING(O)	3.7	$3,000,000	11/11/2013			12/31/2014	4	1							
RECONSTRUCTION(O)	1.6	$500,000	10/17/2012	$500,000	11/24/2010	12/31/2014									
RECONSTRUCTION(O)	1.1	$500,000	6/18/2013			1/15/2015									
RECONSTRUCTION(O)	6.39	$1,735,000	2/13/2013	$875,000	11/4/2011	2/1/2015									
BRIDGE REPLACEMENT(P)	0.1	$350,000	5/21/2013	$350,000	11/17/2011	2/15/2015									
MAJOR WIDENING(O)	1.75	$2,100,000	4/1/2013			2/15/2015	9	1		9	1		6	0	8/1/2012
RECONSTRUCTION(O)	0.2	$555,000	9/13/2012	$555,000	9/28/2011	2/28/2015									
RECONSTRUCTION(O)	1.5	$1,462,500	8/26/2013			2/28/2015									
SAFETY-HAZARD ELIM(P)	0.045	$250,000	7/24/2013	$300,000	1/1/2013	3/1/2015									
RECONSTRUCTION(O)	4.2	$990,000	10/23/2013	$1,000,000	1/1/2013	3/1/2015									
NEW ROUTE(O)	2.8	$1,500,000	9/27/2002			3/30/2015	6	0		6	0		5	0	4/1/2013
MINOR WIDENING(O)	0.858	$148,500	7/25/2012			3/30/2015									
LANDSLIDE REPAIR(P)	3.5	$180,000	12/19/2006			4/1/2015									
MINOR WIDENING(O)	2.06	$3,140,000	6/10/2012	$3,140,000	11/28/2011	4/15/2015									
RECONSTRUCTION(O)	0.9	$811,200	9/13/2012	$710,000	11/21/2011	4/30/2015									
MAJOR WIDENING(O)	3.6	$5,630,000	1/30/2012	$5,000,000	11/2/2009	5/15/2015									
NEW INTERCHANGE(O)		$9,717,856	12/12/2012	$0	11/1/2007	5/15/2015	13	13	1/18/2012	12	3	5/31/2014	12	0	5/15/2015

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	3.1	$3,380,000	8/7/2012	$4,000,000	5/20/2011	6/1/2015	5	0		5	0		4	0	10/1/2013
RECONSTRUCTION(O)	2.314	$2,725,000	5/17/2013			6/1/2015									
SPOT IMPROVEMENTS(O)	3.59	$2,890,000	3/22/2013	$2,890,000	6/25/2012	6/30/2015	6	6	5/15/2013	6	0	12/31/2014	6	0	6/30/2015
SAFETY(P)	0.6	$845,000	12/4/2013	$840,000	2/25/2013	6/30/2015									
SAFETY(P)	0.5	$1,185,000	3/4/2014	$1,230,000	2/25/2013	6/30/2015									
NEW ROUTE(O)	2.3	$1,410,000	1/28/2013	$1,250,000	11/14/2007	7/1/2015									
RECONSTRUCTION(O)	3.444	$1,665,000	9/13/2013	$1,500,000	12/20/2007	7/1/2015	0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$110,000	6/28/2013	$110,000	5/4/2012	7/30/2015									
CONGESTION MITIGTN(O)	2.02	$5,270,000	1/29/2014			7/30/2015									
MAJOR WIDENING(O)	1.4	$1,220,000	11/2/2011	$1,226,000	1/21/2011	7/31/2015									
MAJOR WIDENING(O)	1.5	$2,990,000	9/13/2012	$5,700,000	11/28/2011	8/30/2015	6	0		6	0		6	0	
RECONSTRUCTION(O)	1.9	$2,870,000	11/15/2006			8/30/2015	6			6			6		
MINOR WIDENING(O)	2	$1,025,000	8/13/2012	$1,500,000	11/22/2011	8/30/2015	4	0							
MAJOR WIDENING(O)	1.358	$3,665,000	3/25/2013	$3,800,000	3/1/2011	9/30/2015	5	1		5	0		4	0	10/1/2013
MAJOR WIDENING(O)	3.11	$3,275,000	4/4/2013	$3,810,000	3/1/2011	9/30/2015	4	0		4	0		4	0	10/1/2013
NEW ROUTE(O)	4	$3,285,000	9/20/2013	$3,300,000	8/8/2013	9/30/2015	9	9	12/19/2013	8	0	12/30/2014	8	0	9/30/2015
MAJOR WIDENING(O)	1.5	$3,000,000	5/13/2013			10/15/2015									
NEW ROUTE(O)	2.44	$70,000	6/17/2013			11/15/2015	0	0		0	0		0	0	
MAJOR WIDENING(O)	1.6	$4,827,353	3/22/2011	$6,600,000	10/27/2009	11/30/2015	6			6			6		
NEW ROUTE(O)		$3,300,000	8/29/2013	$3,300,000	7/22/2013	12/30/2015	7	0		7	0		7	0	
NEW ROUTE(O)	3.6	$1,210,000	12/20/2006			12/31/2015									
RECONSTRUCTION(O)	2.5	$2,085,000	1/28/2013	$2,900,000	11/21/2011	2/28/2016									
MINOR WIDENING(O)	3.3	$1,817,000	10/1/2013	$2,500,000	1/1/2013	5/1/2016									
NEW ROUTE(O)		$6,540,000	12/6/2013	$2,550,000	2/18/2011	7/1/2016									
SAFETY(P)	0.2	$1,905,000	3/22/2011	$2,200,000	12/20/2007	7/31/2016									
MAJOR WIDENING(O)	1.243	$2,100,000	9/20/2006			9/15/2016	6	0		6	0		6	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	4.4	$2,400,000	8/22/2012	$2,300,000	10/29/2007	12/31/2017									
RECONSTRUCTION(O)	0.2	$525,000	12/3/1996				6	6	1/10/1997	6	5		6	0	9/15/2001
BRIDGE REPLACEMENT(P)	0.1	$225,000	6/26/1989				4	4		4	4		4	4	4/15/1990
SAFETY-HAZARD ELIM(P)		$80,000	5/12/1998				3	3	4/7/1998	3	3	11/4/1998	3	3	1/1/1999
NEW ROUTE(O)		$1,690,000	4/7/2011												
RECONSTRUCTION(O)		$1,000,000	1/9/2007												
SAFETY(P)		$10,000	1/19/2007												
SAFETY(P)		$15,000	3/14/2007												8/1/2009
NEW ROUTE(O)	4	$1,300,000	4/12/1993				11	11	10/14/1993	11	5		11	1	9/1/1996
NEW ROUTE(O)	0.4	$1,116,000	7/1/1994				7	7	10/20/1994	7	7	5/8/1998	7	4	7/1/1998
SAFETY	0.2	$152,000	8/4/1993				4	4	2/1/1994	4	4		4	4	10/27/1994
RECONSTRUCTION(O)	0.1	$530,000	1/31/1995				4	4	3/8/1995	4	2		4	1	3/1/1998
RECONSTRUCTION(O)	2	$300,000	4/5/1996				4	4	5/30/1996	4	2		4	2	12/1/1997
SPOT IMPROVEMENTS(O)	1.805	$600,000	3/25/1997				2	2	4/10/1997	2	2		2	0	8/1/2000
MAJOR WIDENING(O)		$750,000	8/22/2000				3	0		3	0		3	0	
MAJOR WIDENING(O)	10	$1,750,000	12/5/2007	$1,750,000	10/17/2007										
NEW ROUTE(O)	6.3	$4,250,000	7/27/1998				11	11	2/3/1999	11	5		11	3	11/1/2000
NEW ROUTE(O)	6	$700,000	7/27/1998				2	2	10/16/1998	2	0		2	0	7/1/2001
NEW ROUTE(O)	4.1	$2,500,000	7/27/1998				7	7	11/10/1998	7	7		7	7	4/1/2000
NEW ROUTE(O)	4.7	$800,000	5/6/2005												9/1/2006
NEW ROUTE(O)	4.7	$1,000,000	9/3/2002												9/1/2006
NEW ROUTE(O)	3.6	$2,870,000	6/26/2000				11	1		11	1	10/1/2003	11		6/1/2005
NEW ROUTE(O)	6.3	$1,900,000	8/15/2000				7	1	3/1/2003	7	1		7		
NEW ROUTE(O)	1	$1,000,000	9/27/2002				3	3		3	1		3	0	4/15/2011
RELOCATION(O)	5.2	$3,750,000	8/9/2006				8	8		8	5		8	4	9/1/2011
NEW ROUTE(O)	0.8						5	5		5	1		5	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY	0.3	$150,000	8/6/1993				4	4	9/29/1993	4	4		4	3	2/1/1995
MAJR WIDENING-G&D	1.4	$750,000	2/22/1991				7	7		7	2		7	0	
RELOCATION(O)	4	$1,830,000	8/6/1993				10	10	5/12/1994	10	10	11/11/1996	10	3	2/1/1998
MAJOR WIDENING(O)	3.3	$2,325,000	9/28/1992				7	7	9/3/1992	7	7		7	7	5/12/1994
SAFETY							2	2		2	2		2	0	8/1/1992
MINR WIDENING							2	3		2	0		2	0	
SFTY TE IMPR		$27,856	6/18/1992				5	5	12/12/1990	5	3		5	2	6/1/1991
MINR WIDENING		$1,000	6/18/1992				2	2		2	2		2	2	1/21/1991
SAFETY		$7,500	6/30/1992				4	4		4	4		4	3	6/1/1992
NEW ROUTE(O)	1.3	$2,200,000	4/22/1997				10	10	5/14/1998	10	2		10	0	1/1/2001
NEW ROUTE(O)		$5,000	11/27/1995												
RELOCATION(O)	3.3	$3,250,000	12/20/2006				6	3		8	2		6	0	5/1/2012
SAFETY(P)		$349,375	2/2/2000												
RELOCATION(O)	1.56	$516,000	9/8/1992				8	8	9/20/1991	8	8		8	8	5/19/1994
RELOCATION(O)	4	$2,009,716	3/7/2005				8	8	4/7/1993	8	8		8	1	1/1/1997
SAFETY-HAZARD ELIM(P)	0.092	$8,000	9/15/2011												
SAFETY-HAZARD ELIM(P)	0.4	$550,000	7/17/2001				6	6		6	4		6	0	1/1/2005
SAFETY-HAZARD ELIM(P)	0.218	$500,000	6/18/2004				7	0							12/1/2008
SAFETY-HAZARD ELIM(P)	0.8	$175,000	5/11/2005												12/1/2005
SAFETY-HAZARD ELIM(P)	0.3	$815,000	8/7/2006												7/1/2007
BRIDGE REPLACEMENT(P)	0.1	$100,000	11/6/2002					0							4/1/2004
BRIDGE REPLACEMENT(P)	0.1	$188,000	10/9/2002												4/1/2006
BRIDGE REPLACEMENT(P)	0.1	$200,000	11/4/2002												11/1/2009
BRIDGE REPLACEMENT(P)	0.1	$100,000	11/30/2004												2/1/2006
BRIDGE REPLACEMENT(P)	0.1	$250,000	8/25/2005				4	2		4	0		4	0	7/1/2011
BRIDGE REPLACEMENT(P)	0.1	$100,000	6/15/2004												1/1/2006

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/7/2002												
BRIDGE REPLACEMENT(P)	0.1	$95,000	3/21/2005												6/1/2005
BRIDGE REPLACEMENT(P)	0.1	$100,000	6/18/2004												8/1/2006
BRIDGE REPLACEMENT(P)	0.1	$130,000	8/5/2010	$130,000	10/26/2009		2	2		2	0		2	0	9/1/2011
BRIDGE REPLACEMENT(P)	0.1	$150,000	10/28/2005												8/1/2008
BRIDGE REPLACEMENT(P)	0.1	$120,000	10/26/2006												8/1/2008
BRIDGE REPLACEMENT(P)	0.1	$200,000	11/7/2007	$100,000	10/17/2007								3	3	6/2/2009
BRIDGE REPLACEMENT(P)	0.1	$282,000	8/21/1992				6	6	7/28/1993	6	6		6	6	10/21/1994
BRIDGE REPLACEMENT(P)	0.1	$25,000	7/6/1990				3	3		3	3		3	3	5/29/1991
BRIDGE REPLACEMENT(P)	0.1						6	6		6	6		6	6	5/16/1991
BRIDGE REPLACEMENT(P)	0.1	$84,000	3/23/1990				3	3		3	3		3	3	8/1/1991
BRIDGE REPLACEMENT(P)	0.1	$90,000	9/7/1990				3	3		3	3		3	3	9/1/1991
BRIDGE REPLACEMENT(P)	0.1	$195,000	8/3/1990				4	4		4	4		4	4	6/6/1991
BRIDGE REPLACEMENT(P)	0.1	$188,000	1/9/1990				4	4	1/2/1991	4	4		4	3	9/1/1991
BRIDGE REPLACEMENT(P)	0.1	$40,000	6/14/1994				2	2	8/18/1994	2	2		2	2	3/28/1995
BRIDGE REPLACEMENT(P)	0.1	$50,000	4/25/1991				3	3	9/24/1991	3	3		3	3	7/1/1992
BRIDGE REPLACEMENT(P)	0.5	$300,000	6/9/1992				5	5	8/13/1992	5	5		5	5	9/16/1994
BRIDGE REPLACEMENT(P)	0.1	$402,000	9/8/1992				6	6	3/2/1993	6	6		6	6	12/1/1994
BRIDGE REPLACEMENT(P)	0.1	$60,000	10/19/1993				2	2	8/23/1994	2	2	4/5/1995	2	2	5/23/1995
BRIDGE REPLACEMENT(P)	0.1	$50,000	1/24/1997				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$68,000	8/24/1992				2	2	9/30/1992	2	2		2	2	6/25/1993
BRIDGE REPLACEMENT(P)	0.1						4	0		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$12,000	10/18/1991				2	2	1/10/1992	2	2		2	2	1/23/1992
BRIDGE REPLACEMENT(P)	0.1	$74,000	10/22/1991				4	4	2/4/1992	4	4		4	4	9/28/1992
BRIDGE REPLACEMENT(P)	0.1	$325,000	10/25/2013	$175,000	10/26/2009		0	0		0	0		0	0	5/1/2012
BRIDGE REPLACEMENT(P)	0.1	$110,000	4/12/1993				5	5	6/29/1993	5	5		5	5	11/2/1994

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RELOCATION(O)	4.87	$2,065,000	9/8/1992				6	6	12/28/1990	6	3		6	0	8/1/1992
NEW ROUTE(O)	4						8	8	1/4/1991	8	2		8	0	11/1/1991
BRIDGE REPLACEMENT(P)	0.1	$350,000	10/25/2013												
NEW ROUTE(O)	2.5	$510,000	12/7/1992				3	3	1/28/1993	3	3	3/15/1994	3	3	5/5/1995
NEW ROUTE(O)	1	$1,580,000	9/12/1994				4	4	7/18/1995	4	0		4	0	5/1/1997
BRIDGE REPLACEMENT(P)	0.1	$250,000	9/1/1994				5	5	11/1/1994	5	5		5	2	11/1/1997
BRIDGE REPLACEMENT(P)	0.386	$1,500,000	12/22/1997				8	8	5/14/1998	8	3		8	0	1/1/2001
BRIDGE REPLACEMENT(P)	0.1	$100,000	11/27/1995				3	3	8/12/1995	3	3		3	0	10/1/1997
BRIDGE REPLACEMENT(P)	0.1	$530,000	3/16/1995				5	5	10/8/1994	5	5		5	3	4/1/1997
BRIDGE REPLACEMENT(P)	0.1	$395,000	12/12/1994				6	6	7/6/1995	6	2		6	1	12/1/1997
BRIDGE REPLACEMENT(P)	0.1	$485,000	12/5/1995				7	7	12/7/1995	7	1		7	1	9/1/1997
BRIDGE REPLACEMENT(P)	0.1	$570,000	9/11/1995				5	5	10/11/1995	5	5		5	4	10/1/1997
BRIDGE REPLACEMENT(P)	0.1	$150,000	2/15/1996				3	3	3/11/1996	3	3		3	1	9/15/1997
BRIDGE REPLACEMENT(P)	0.1	$85,000	3/11/1997				2	2	3/27/1997	2	0		2	0	3/1/1998
BRIDGE REPLACEMENT(P)	0.1	$75,000	11/22/1996				2	2	1/9/1997	2	2		2	2	10/1/1997
BRIDGE REPLACEMENT(P)	0.1	$135,000	3/9/1998				4	4	4/7/1998	4	3		4	2	6/1/1999
BRIDGE REPLACEMENT(P)	0.1	$80,000	3/11/1997				2	2	###########	2	0		2	0	3/1/1998
BRIDGE REPLACEMENT(P)	0.1	$105,000	9/17/1997				2	2	2/6/1998	2	1		2	0	9/1/1998
BRIDGE REPLACEMENT(P)	0.1	$132,036	6/23/2004				7	7	1/10/1997	7	7	1/21/1999	7	3	4/1/1999
BRIDGE REPLACEMENT(P)	0.1	$80,000	5/15/1998				3	2	1/20/1999	3	0		3	0	9/1/1999
BRIDGE REPLACEMENT(P)	0.1	$104,700	7/17/1996				5	5	8/8/1996	5	5	10/14/1997	5	3	12/15/1997
BRIDGE REPLACEMENT(P)	0.1	$30,000	9/17/1997				2	2	2/6/1998	2	1		2	0	9/1/1998
BRIDGE REPLACEMENT(P)	0.1	$50,000	12/6/1996				3	3	1/10/1997	3	1		3	1	4/1/1998
BRIDGE REPLACEMENT(P)	0.1	$38,500	4/30/1997				3	2	8/8/1996	3	2	9/10/1996	3	3	10/21/1996
BRIDGE REPLACEMENT(P)	0.1	$8,400	1/23/2003				1	0		1	0		1	0	3/26/2001
BRIDGE REPLACEMENT(P)	0.6	$390,947	3/14/2013				0	0		0	0		0	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$100,000	4/3/1998				1	0	7/1/1998	1	0		1	0	8/1/1999
BRIDGE REPLACEMENT(P)	0.1	$800,000	7/26/2001				5	0		5	0		5	0	5/1/2006
BRIDGE REPLACEMENT(P)	0.1	$375,000	4/6/2001				0	0		0	0		0	0	9/1/2002
BRIDGE REPLACEMENT(P)	0.414	$250,000	1/22/2001				3	3	3/1/2002	3	1		3	0	6/1/2003
BRIDGE REPLACEMENT(P)	0.288	$200,000	3/23/2001				0	0		0	0		0	0	5/1/2003
BRIDGE REPLACEMENT(P)	0.4	$750,000	7/3/2000				5	0		5	0		5	0	5/15/2002
BRIDGE REPLACEMENT(P)	0.1	$55,000	10/9/1997				2	2	8/14/1997	2	0		2	0	3/1/1998
BRIDGE REPLACEMENT(P)	0.1	$30,504	7/26/2005				4	3		4	0		4	0	9/1/2001
BRIDGE REPLACEMENT(P)	0.1	$1,500,000	10/11/2001				7	0		7	0		7	0	8/1/2004
BRIDGE REPLACEMENT(P)	0.1	$0	3/21/2005				6	6	8/14/1997	6	6	9/8/1998	6	4	12/15/1998
BRIDGE REPLACEMENT(P)	0.1	$450,000	7/14/2000				3			3			3		6/1/2002
BRIDGE REPLACEMENT(P)	0.1	$250,000	6/15/2001				5			5			5		7/1/2003
BRIDGE REPLACEMENT(P)	0.1	$250,000	6/15/2001				5			5			5		8/1/2003
BRIDGE REPLACEMENT(P)	0.1	$375,000	5/9/2007												2/1/2008
BRIDGE REPLACEMENT(P)		$10,000	7/21/2011				0			0			0		
ROCKFALL MITIGTN(P)	0.2	$15,000	10/29/2000												6/1/2001
RECONSTRUCTION(O)		$800,000	5/4/2010				5	4		5	2		5	2	4/1/2010
MAJOR WIDENING(O)		$1,250,000	3/2/2011				6	6		6	4		6	0	7/1/2012
RECONSTRUCTION(O)	1.6	$2,000,548	11/1/2005												7/1/2007
RECONSTRUCTION(O)	0.2	$50,000	12/14/2011				3	3		3	0		3	0	
MINOR WIDENING(O)	0.1	$320,000	3/30/2011	$300,000	10/26/2009		5	4		5	0		5	0	11/1/2011
SAFETY-HAZARD ELIM(P)		$560,000	3/29/2010	$550,000			4	4		4	4		4	1	4/1/2012
RECONSTRUCTION(O)		$230,000	9/7/2010				5	2		5	0		5	0	9/1/2011
REST AREA REHAB(P)		$175,000	2/27/1991				2	2		2	0		2	0	
RECONSTRUCTION(O)	0.1	$495,000	7/17/2002				5	5		5	5		5	1	
MAJOR WIDENING(O)	0.7	$490,000	10/14/1997				6	6		6	5		6	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RECONSTRUCTION(O)		$310,000	5/10/1995				5	5		5	1		5	0	
MAJOR WIDENING(O)	1	$760,000	7/1/1994				6	6	1/17/1992	6	6		6	0	
MAJOR WIDENING(O)	1.3	$1,198,866	3/31/2005				8	8	7/26/1991	8	7		8	1	
MAJOR WIDENING(O)	0.8	$2,475,000	5/3/1996				6	6		6	3		6	0	
MAJOR WIDENING(O)	1.8	$1,526,260	3/31/2005				6	6	12/18/1991	6	6		6	0	
NEW ROUTE(O)	0.8	$120,000	4/19/1997				5	5		5	1		5	0	
NEW ROUTE(O)	7.6	$1,274,049	8/15/2012				8	0		8	0		8	0	
NEW ROUTE(O)	2.7	$800,000	9/4/2003				4	4		4	4				
NEW ROUTE(O)	4.9	$628,000	7/26/2010				3	3							
SAFETY-RR SEPARATN(P)	1.12	$205,000	8/15/2000				5	5		5	3		5	1	
BRIDGE REPLACEMENT(P)	0.303						2	2		2	2		2	0	3/22/1991
NEW ROUTE(O)	4	$985,000	4/26/1994				8	8		8	5		8	2	
NEW ROUTE(O)	7.1	$300,000	8/6/1993				3	3		3	3		3	0	
NEW ROUTE(O)	1.9						6	6	6/3/1987	6	3		6	0	
MAJOR WIDENING(O)	3.46						6	6		6	6		6	3	
MAJOR WIDENING(O)	2.6						7	7		7	7		7	7	9/1/1991
NEW ROUTE(O)	4.7	$558,000	1/30/1993				2	2	4/14/1993	2	2		2	2	
MINOR WIDENING(O)	1.4	$200,000	2/21/2000												
MAJOR WIDENING(O)	0.9	$150,000	1/30/2012	$150,000	10/26/2011										
RECONSTRUCTION(O)	1.7	$4,000,000	10/9/2002				8	8		8	8		8	3	
NEW INTERCHANGE(O)	0.2	$265,000	8/22/2001				4	4		4	4		4		
MAJOR WIDENING(O)	3.6	$335,000	11/20/2012												
SPOT IMPROVEMENTS(O)	0.1	$205,000	3/21/2007												
SPOT IMPROVEMENTS(O)	0.1	$345,000	3/21/2007												
MAJOR WIDENING(O)	3.1	$1,545,000	1/29/1992				8	8	7/2/1993	8	8		8	0	
CONGESTION MITIGTN(O)	0.1	$420,000	12/21/2010	$400,000	11/9/2007										

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
CONGESTION MITIGTN(O)		$211,000	8/1/1991				5	5	11/20/1991	5	5		5	3	
RECONSTRUCTION(O)	1.1	$200,000	8/17/2009	$200,000	11/9/2007										
NEW ROUTE(O)	0.3	$150,000	10/24/1995				6	6		6	6		6	6	
RECONSTRUCTION(O)	0.1	$27,373	10/22/2004				6	6		6	5		6	0	
SAFETY	0.75	$55,000	2/8/1994				5	5		5	3		5	2	
SAFETY	0.1	$70,000	5/10/1995				5	5		5	4		5	2	
SAFETY	0.26	$60,000	6/14/1994				4	4		4	4		4	4	1/1/1995
BRIDGE REPLACEMENT(P)	0.1	$35,000	3/24/1993				4	4	9/16/1993	4	4		4	2	
BRIDGE REPLACEMENT(P)	0.1	$40,000	8/7/1989				3	3		3	3		3	3	
RECONSTRUCTION(O)		$760,000	11/18/2013	$700,000	11/9/2007										
BRIDGE REPLACEMENT(P)	0.1	$20,000	9/25/1989				2	2		2	2		2	2	7/19/1991
MAJOR WIDENING(O)	0.2	$130,000	11/22/1996				6	6		6	5		6	0	
RECONSTRUCTION(O)	0.1	$35,000	6/24/1994				2	2	9/21/1994	2	2		2	2	
MAJOR WIDENING(O)	1.1	$1,000,000	10/26/1998				7	7		7	0		7	0	
MAJOR WIDENING(O)	2.3	$500,000	10/26/1998				5	5		5	1		5		
MAJOR WIDENING(O)	3.4	$3,000,000	7/8/2002				7	7		7	7		7	4	
BRIDGE REPLACEMENT(P)	0.1	$10,173	3/7/2005				3	3		3	0		3	0	
SAFETY		$16,000	10/27/1995				1	1		1	1				
MAJOR WIDENING(O)	1.8	$2,750,000	5/9/2006				7	7		7	2		7	0	
SAFETY-HAZARD ELIM(P)	0.168	$100,000	7/7/1999				5	5		5			5		
CONGESTION MITIGTN(O)	0.3	$83,579	11/2/2004				6	6		6	3		6	0	
GRADE DRAIN & SURFAC	5.4						0	0		0	0		0	0	
SAFETY		$35,000	3/20/1996				0	0		0	0		0	0	
NEW ROUTE(O)	0.667	$7,500	12/20/1994				2	2	1/3/1992	2	2		2	2	
MAJOR WIDENING(O)	1	$305,000	11/22/1993				6	6		6	2		6	0	
SAFETY		$85,000	2/1/1991				5	5		5	4		5	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY		$85,000	1/27/1992				5	5		5	5		5	2	
MAJR WIDENING		$82,000	6/29/1990				8	3		8	0		8	0	
RELOCATION(O)	0.459						4	4		4	4		4	4	4/1/1990
RELOCATION(O)	3.5	$7,580,000	4/23/2012				9	9		9	2		9	0	
SAFETY	0.1	$125,000	8/2/1994				5	5		5	5		5	4	
MAJOR WIDENING(O)	1.1	$835,754	3/7/2005				8	8		8	6		8	0	
BRIDGE REHAB(P)	0.1	$300,000	4/25/1994				0	0		0	0		0	0	
BYPASS(O)	4.3	$1,096,424	4/8/2009				8	8		8	6		8	1	
MAJOR WIDENING(O)	1.1	$1,480,000	6/21/1995				7	7	7/30/1992	7	7		7	3	
MAJOR WIDENING(O)	4.128						4	4	7/28/1991	4	2		4	0	
SAFETY	0.2	$140,000	7/13/1993				5	5	9/15/1993	5	5		5	5	
MINOR WIDENING(O)	8	$297,000	12/24/1991				7	7	3/2/1992	7	4		7	2	
NEW ROUTE(O)	1.4	$275,000	7/12/1991				4	4		4	4		4	0	
RELOCATION(O)	1.4	$450,000	6/6/1994				5	5	9/23/1994	5	4		5	1	
MINOR WIDENING(O)	0.2	$64,148	10/22/2004				6	6		6	5		6	0	
MAJOR WIDENING(O)	1.1	$750,000	8/13/1997				7	7		7	5		7	0	
MAJOR WIDENING(O)	4.4	$1,730,000	3/25/1999				7	7		7	6		7	0	
SAFETY(P)	7.8	$250,000	4/5/2011	$7,090,000	11/13/2007										
MAJR WIDENING	0.49	$336,000	9/26/1989				5	5		5	5		5	4	8/1/1991
MAJOR WIDENING(O)	0.42	$15,000	11/10/1992				5	5	7/10/1991	5	5		5	0	
NEW INTERCHANGE(O)		$42,000	6/28/1991				5	5	7/23/1991	5	5		5	4	
NEW INTERCHANGE(O)		$75,000	6/22/1995				5	5		5	5		5	1	
MAJOR WIDENING(O)	0.4	$275,000	10/26/1998				4	4		4	2		4	0	
MINOR WIDENING(O)		$200,000	6/2/2008	$200,000	11/13/2007										
RECONSTRUCTION(O)	0.569	$300,000	7/26/2013												
RECONSTRUCTION(O)	11.8						0	0		0	0		0	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY-HAZARD ELIM(P)	0.2	$250,000	1/4/2006				4	4		4	3		4	3	
BRIDGE REPLACEMENT(P)	0.042	$25,000	12/20/1993				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$25,000	12/20/1993				3	3		3	3		3	3	
SAFETY-HAZARD ELIM(P)	0.3	$185,000	7/11/2001				5	5		5	3		5	0	
SAFETY-HAZARD ELIM(P)	0.1	$80,000	11/4/2002				4	4		4	4		4	1	
SAFETY-HAZARD ELIM(P)	0.9	$1,466	5/24/2004												
SAFETY-HAZARD ELIM(P)	0.1	$1,225,000	10/14/2010				5	5		3	1				
NEW ROUTE(O)	1.49	$375,000	12/8/1993				4	4	7/26/1992	4	4		4	1	
SAFETY-HAZARD ELIM(P)		$145,000	6/22/2004				3	3		3	3				
SAFETY-HAZARD ELIM(P)	0.3	$100,000	2/3/2011	$90,000	11/13/2007										
SAFETY-HAZARD ELIM(P)	0.2	$220,000	6/22/2004				4	4		4	4		4	2	
BRIDGE REPLACEMENT(P)	0.1	$25,000	3/15/1994				3	3		3	3		3	3	
SAFETY-HAZARD ELIM(P)	0.2	$35,600	4/24/2008				4	4		4	4		4	2	
SAFETY-HAZARD ELIM(P)	0.4	$210,000	3/4/2011	$200,000	11/13/2007										
BRIDGE REPLACEMENT(P)	0.46	$269,000	6/9/1992				6	6		6	4		6	0	
BRIDGE REPLACEMENT(P)	0.2	$45,000	4/13/1992				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.4	$45,000	6/24/1994				3	3		3	3		3	2	
BRIDGE REPLACEMENT(P)	0.1	$10,054	11/15/2004				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.3	$390,000	11/22/1996				5	5		5	4		5	0	
NEW ROUTE(O)	5.2	$429,000	2/28/1994				6	6		6	1		6	0	
NEW ROUTE(O)	3.8	$480,000	9/21/1994				3	3		3	0		3	0	
NEW ROUTE(O)	2.3	$390,000	3/24/1993				4	4	4/16/1993	4	3		4	1	
BRIDGE REPLACEMENT(P)	0.118	$75,000	11/19/1997				4	4	9/17/1998	4	3		4	3	
BRIDGE REPLACEMENT(P)	0.3	$45,000	3/30/1994				3	3		3	3		3	3	1/19/1995
BRIDGE REPLACEMENT(P)	0.1	$33,000	9/1/1994				4	4		4	1		4	1	
BRIDGE REPLACEMENT(P)	0.1	$290,000	6/9/2004				7	7		7	4		7	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$65,000	2/7/1997				3	3		3	2		3	2	
BRIDGE REPLACEMENT(P)	0.1	$10,000	1/28/2002				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$15,000	7/31/1995				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$105,000	10/24/1994				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$19,078	6/23/2004				6	6		6	5		6	4	
BRIDGE REPLACEMENT(P)	0.101	$75,000	11/25/1998				3	3		3	2		3	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	9/30/1997				3	3		3	3		3	3	10/29/1998
BRIDGE REPLACEMENT(P)	0.1	$35,000	11/19/2001				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$75,000	12/21/2004				3	3		3	3		3	1	
BRIDGE REPLACEMENT(P)	0.1	$60,000	6/18/2004				4	4		4	3		4	3	
BRIDGE REPLACEMENT(P)	0.1	$1,921	3/7/2005				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$20,000	12/21/2004												
BRIDGE REPLACEMENT(P)	0.1	$40,000	6/18/2004				2	2		2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$150,000	12/28/2004				5	5		5	3		5	3	
BRIDGE REPLACEMENT(P)	0.1	$190,000	5/25/2010	$180,000	10/30/2009										
BRIDGE REPLACEMENT(P)	0.1	$60,000	8/12/2013	$320,000	10/30/2009										
BRIDGE REPLACEMENT(P)	0.1	$110,000	3/31/2010	$110,000	10/30/2009										
ROCKFALL MITIGTN(P)	0.5	$10,000	11/22/2000				1	0		1	0		1	0	
ROCKFALL MITIGTN(P)	0.1	$10,000	11/22/2000				0	0		0	0		0	0	
ROCKFALL MITIGTN(P)	0.2	$25,000	4/24/2000				1	0		1	0		1	0	
MAJOR WIDENING(O)	3.7	$4,546,000	4/29/2008				7	7		7	6		7		
SAFETY(P)		$150,000	6/19/2000				5	5		5	3		5	0	
I-CHANGE RECONST(O)		$520,000	2/28/2012	$500,000	11/23/2011										
MAJOR WIDENING(O)	4.5	$500,000	1/10/2000				4	4	2/9/2000	3	3	12/30/2000	3	3	1/30/2001
MAJOR WIDENING(O)	5.8	$430,000	10/31/2000				5	5	10/10/2000	2	2	12/30/2000	2	2	3/15/2001
MAJOR WIDENING(O)	5.26	$405,000	10/31/2000				8	8	3/14/2001	4	4	11/30/2001	4	4	3/31/2002

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	3.46	$315,000	4/3/2001				5	5	1/4/2001	0	0		0	0	
MAJOR WIDENING(O)	2.6	$2,350,000	4/12/2007												
MAJOR WIDENING(O)	5.8	$340,000	11/30/2000				10	10	4/25/2001	0	0		0	0	
MAJOR WIDENING(O)	3.53	$2,670,000	7/15/2005				8	8	5/25/2005	6	6	3/15/2006	6	6	8/26/2006
MAJOR WIDENING(O)	4.58	$60,000	9/20/2005				5	5	11/22/2005	5	5	1/31/2007	5	5	6/30/2007
MAJOR WIDENING(O)	3.93	$375,000	1/8/2007				4	4	1/18/2007	3	3	4/30/2007	3	3	10/3/2007
MAJOR WIDENING(O)	4.24	$390,000	3/1/2007				4	4	5/4/2007	3	3	9/30/2007	3	3	11/30/2007
MAJOR WIDENING(O)	4	$1,000,000	1/17/2006				12	12	7/22/2010	3	3	9/15/2010	5	3	10/22/2010
MAJOR WIDENING(O)	4.4	$2,000,000	1/28/2011				6	6	3/30/2011	2	2	8/10/2011	2	2	5/31/2012
MAJOR WIDENING(O)	5.3	$535,000	11/6/2012	$500,000	10/17/2007		5	5		5			5		
I-CHANGE RECONST(O)	0.6	$760,000	12/13/2010	$500,000	10/30/2009		8	8	1/25/2011	1	1	12/31/2011	5	0	7/31/2012
MAJOR WIDENING(O)	0.4	$1,080,000	11/27/1996				5	5	11/30/1994	4	4		4	4	
MAJOR WIDENING(O)	2.59	$1,870,000	3/4/1994				6	6		6	6		6	6	
NEW ROUTE(O)	1.9	$2,340,000	8/27/2009				5	5	11/1/2007	6	6	8/31/2009	6	5	7/15/2010
SAFETY-RR SEPARATN(P)	0.53	$425,000	8/13/1999				5	5	11/10/1999	4	4	10/1/2000	4	4	12/30/2001
MAJOR WIDENING(O)	0.3	$1,080,000	6/28/2010	$2,400,000	10/30/2009		8	8	10/6/2010	4	2	7/31/2012	7	1	10/15/2012
SPOT IMPROVEMENTS(O)	2.65	$2,500,000	1/11/2010	$2,500,000	10/30/2009		10	10	2/18/2010	7	2	8/19/2011	7	0	6/30/2012
SAFETY-HAZARD ELIM(P)	0.32	$600,000	6/2/2003				10	10	10/11/2010	7	7	6/17/2011	7	1	8/31/2011
MAJOR WIDENING(O)	1.7	$2,115,000	12/5/2010	$2,115,000	10/30/2009		7	7	7/20/2011	7	1	8/31/2012	7	0	2/15/2013
MINOR WIDENING(O)	2.4	$1,600,000	6/25/2007				5	5	7/18/2007	5	5	11/30/2009	5	3	1/31/2010
DRAINAGE IMPROVE(P)	1.3	$40,000	8/30/2005				5	5	5/31/2005	1	1	11/16/2005	1	1	7/7/2006
SAFETY(P)	0.3	$50,000	11/17/2004				3	3	12/15/2004	2	2	3/15/2005	2	2	5/15/2005
SAFETY(P)		$0	12/14/2004												
MAJOR WIDENING(O)	3.26	$130,000	12/15/2006												
SFTY TE IMPR	0.69	$235,000	6/22/1992				3	3		3	3		3	3	3/1/1991
MAJR WIDENING	1.27	$331,000	1/10/1989				5	5		5	5		5	5	8/1/1990

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RELOCATION(O)	3.9	$540,000	6/23/2008				5	5		5	5		5	5	
SPOT IMPROVEMENTS(O)	1.7	$500,000	3/2/2001				6	6	6/27/2001	3	3	5/8/2003	3	3	9/15/2004
RECONSTRUCTION(O)	0.833	$1,000,000	1/22/2001				6	6	9/19/2001	6	6	8/8/2006	5	5	11/15/2006
MAJOR WIDENING(O)	1.7	$1,485,000	4/17/1997				7	7	6/6/1997	6	6	4/1/2000	7	7	12/30/2000
RELOCATION(O)	4.1	$400,000	12/19/1997				4	4	1/12/1998	4	4	12/31/1999	4	4	12/30/2000
RELOCATION(O)	3.5	$646,833	11/2/2004				4	4	1/12/1998	4	4	10/15/2000	4	4	12/30/2000
RELOCATION(O)	3.5	$600,000	4/22/1997				4	4	8/5/1998	4	4	12/31/2001	4	4	3/31/2002
RELOCATION(O)	4.3	$1,765,000	11/20/2000				7	7	2/21/2001	4	4	4/30/2002	4	4	7/26/2002
NEW ROUTE(O)	0.75	$500,000	9/14/2006				8	8	3/28/2007	7	7	8/31/2009	7	6	2/28/2010
BRIDGE REPLACEMENT(P)	0.1	$20,000	8/8/1996				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.19	$20,000	10/18/1991				2	2	12/13/1991	2	2		2	2	10/15/1992
BRIDGE REPLACEMENT(P)	0.2	$30,000	8/15/1996				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.25	$35,000	1/22/1992				2	2	2/28/1992	2	2		2	2	2/15/1993
RELOCATION(O)	1.2	$885,779	3/7/2005				5	5	2/2/1994	4	4	4/1/1999	4	4	12/30/2000
RELOCATION(O)	2.74	$392,000	9/1/1993				5	5	3/31/1995	5	5		5	5	
RELOCATION(O)	1.99	$123,000	10/9/1991				4	4		4	4		4	4	9/27/1991
BRIDGE REPLACEMENT(P)	0.59	$110,000	8/9/1988				4	4		4	4		4	4	12/1/1990
SAFETY(P)	0.18	$321,000	6/14/1991				5	5		5	5		5	5	12/1/1992
SFTY TE IMPR	0.15	$62,000	6/14/1991				5	5		5	5		5	5	7/1/1991
RECONSTRUCTION(O)	2	$680,000	4/16/1997				6	6		5	5		5	5	
NEW ROUTE(O)	2.2	$1,400,000	6/23/2008	$1,400,000	10/31/2007		9	9	8/13/2008	7	6	8/31/2009	7	4	1/31/2010
NEW ROUTE(O)	1.2	$375,000	9/16/2009				7	7	12/8/2005	7	6	8/31/2009	7	4	1/31/2010
NEW ROUTE(O)	3.23	$1,400,000	3/31/2006				9	9	12/15/1999	0	0		0	0	
SPOT IMPROVEMENTS(O)	0.2	$100,000	7/27/1998				3	3	2/18/1999	3	3	10/1/2000	3	3	12/30/2000
SPOT IMPROVEMENTS(O)	0.4	$75,000	2/13/1997				3	3		1	1		1	1	
MAJOR WIDENING(O)	4.89	$125,000	12/7/1992				6	6		6	6		6	6	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RELOCATION(O)	2.65						4	4		4	4		4	4	4/15/1991
RELOCATION(O)	5.17	$1,075,000	8/6/1993				8	8	11/19/1991	8	8		8	8	
NEW ROUTE(O)	3.85	$1,641,000	10/20/1992				8	8		8	8		8	8	
NEW ROUTE(O)	2.99	$379,000	11/17/1994				8	8	1/18/1991	8	8		7	7	8/1/1992
NEW ROUTE(O)	2.99						0	0		0	0		0	0	
MAJOR WIDENING(O)	2.183	$2,555,000	10/21/1998				7	7	11/10/1998	7	7	4/30/2001	7	7	12/31/2001
GRADE DRAIN & SURFAC	16.5	$811,400	11/10/1988				0	0		0	0		0	0	
RELOCATION(O)	0.79	$426,000	1/27/1992				5	5		5	5		5	5	11/1/1991
RELOCATION(O)	0.24	$12,000	6/29/1990				1	1		1	1		1	1	8/1/1991
MINR WIDENING	1.68	$330,000	2/18/1992				5	5		5	5		5	5	3/15/1992
NEW INTERCHANGE(O)		$670,000	7/13/1993				5	5	7/23/1993	5	5		5	5	
MAJOR WIDENING(O)	3.7	$1,725,806	1/26/2005				9	9	9/6/1991	9	9		9	9	
MAJOR WIDENING(O)	3.34	$505,000	11/21/1992				7	7	7/25/1991	7	7		7	7	1/15/1993
NEW ROUTE(O)	3.8	$1,163,000	3/24/1993				7	7		7	7		7	7	1/1/1992
NEW ROUTE(O)	2.99						0	0		0	0		0	0	
MAJOR WIDENING(O)	4.8	$445,509	6/16/2005				8	8		6	6		6	6	
RELOCATION(O)	4.81	$2,530,000	1/18/2012				6	6	8/31/2005	6	6	10/15/2007	6	6	4/15/2008
RELOCATION(O)	3.95	$1,250,000	11/7/2006				9	9	8/15/2006	9	8	10/31/2010	9	7	4/30/2011
SAFETY	0.22	$70,000	4/20/1992				4	4		4	4		4	4	
SLIDE REPAIR		$5,000	12/24/1991				2	2	2/11/1992	2	2		2	2	
SLIDE REPAIR		$7,888	4/25/1994				3	3	3/5/1992	3	3		3	3	
SAFETY	0.35	$50,000	4/12/1994				5	5		5	5		5	5	
MAJOR WIDENING(O)	2.8	$2,200,000	7/14/2002				8	8	9/4/2002	7	7	2/13/2008	8	4	9/30/2008
MAJOR WIDENING(O)	1	$900,000	9/29/2004				6	6	9/28/2004	5	5	11/15/2004	5	5	1/31/2005
NEW ROUTE(O)	0.4	$1,800,000	2/2/2005				6	6	11/2/2001	6	6	11/30/2004	6	6	9/30/2005
MAJOR WIDENING(O)	1.67	$1,795,000	4/1/2009				8	8	8/28/2002	8	8	10/4/2006	8	8	7/31/2007

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	1.4	$550,000	11/14/2012				9	9	1/21/2010	6	4	10/31/2010	9	1	12/31/2011
MAJOR WIDENING(O)	2.1	$3,279,422	5/24/2012	$2,250,000	11/1/2007		9	9	10/29/2009	9	8	10/31/2011	9	0	6/30/2012
SAFETY-HAZARD ELIM(P)		$380,000	1/14/2014				6	6	8/10/2011	2	2	7/15/2012	6	1	12/15/2012
SAFETY(P)	0.318	$1,040,000	7/27/2011				5	5	7/29/2011	5	3	11/30/2011	5	0	3/31/2012
SAFETY-HAZARD ELIM(P)	0.724	$200,000	4/19/2004				4	4	5/15/2004	4	4	9/30/2004	4	4	3/31/2005
SAFETY-HAZARD ELIM(P)	0.2	$5,000	3/28/2001				3	3	3/21/2001	1	1		1	1	
SAFETY-HAZARD ELIM(P)		$10,000	8/7/2006				1	1	11/15/2006	0	0	1/31/2007	0	0	6/22/2007
SAFETY-HAZARD ELIM(P)	0.1	$100,000	4/18/2006				6	6	8/8/2006	1	1	7/15/2007	6	6	8/24/2007
BRIDGE REPLACEMENT(P)	0.16	$15,000	2/18/1992				3	3		3	3		3	3	10/15/1992
SAFETY-HAZARD ELIM(P)	0.3	$406,529	7/11/2003												
SAFETY-HAZARD ELIM(P)	0.4	$1,180	8/17/2005				4	4	12/8/1999	0	0		0	0	
SAFETY-HAZARD ELIM(P)	0.1	$100,000	6/6/2006				3	3	8/10/2006	3	3	12/8/2006	3	3	1/26/2007
SAFETY-HAZARD ELIM(P)	0.1	$55,000	4/18/2006				4	4	8/9/2006	1	1	12/31/2006	1	1	11/9/2006
SAFETY-HAZARD ELIM(P)	0.877	$23,000	2/2/2009				5	5	2/23/2005	1	1	2/15/2006	1	1	7/31/2006
BRIDGE REPLACEMENT(P)	0.24	$40,000	2/1/1994				4	4	9/30/1994	4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$20,000	12/11/2006				1	1	3/7/2007	1	1	4/30/2007	1	1	5/25/2007
BRIDGE REPLACEMENT(P)	0.1	$75,000	5/19/2003				4	4	6/11/2003	4	4	1/31/2004	4	4	3/12/2004
BRIDGE REPLACEMENT(P)	0.1	$9,000	5/6/1992				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.09	$40,000	8/7/1992				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.18	$45,000	8/7/1992				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.15	$40,000	2/1/1994				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$40,000	9/21/1994				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$35,000	8/2/1994				2	2		2	2		2	2	
NEW ROUTE(O)	4.6	$790,000	7/19/1994				5	5	8/17/1994	5	5		5	5	
NEW ROUTE(O)	4.6	$630,000	4/26/1994				4	4	8/17/1994	4	4		4	4	
NEW ROUTE(O)	5.44	$900,000	8/12/1994				4	4	8/18/1994	4	4		4	4	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
NEW ROUTE(O)	4.07	$685,000	4/26/1994				5	5	8/18/1994	5	5		5	5	
NEW ROUTE(O)	6.3	$1,089,000	2/8/1994				5	5		5	5		5	5	
BRIDGE REPLACEMENT(P)	0.24	$49,000	7/5/1994				3	3	3/15/1995	3	3		3	3	5/15/1996
BRIDGE REPLACEMENT(P)	0.25	$75,000	1/30/1993				4	4	3/8/1993	4	4		4	4	9/1/1993
BRIDGE REPLACEMENT(P)	0.1	$35,000	7/28/1997				3	3		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$1,003	3/7/2005				3	3	11/8/2000	0	0		0	0	
BRIDGE REPLACEMENT(P)	0.64	$165,000	4/11/2001				4	4	9/12/2001	4	4	10/9/2002	4	4	1/31/2003
BRIDGE REPLACEMENT(P)	0.1	$606	10/26/2005				1	1	12/18/2002	1	1	1/7/2003	1	1	1/14/2003
BRIDGE REPLACEMENT(P)	0.1	$50,000	10/9/2002				4	4	11/6/2002	3	3	1/31/2004	3	3	3/12/2004
BRIDGE REPLACEMENT(P)	0.1	$40,000	10/24/2005				3	3	12/15/2005	2	2	3/15/2006	2	2	5/26/2006
BRIDGE REPLACEMENT(P)	0.1	$1,892	10/26/2005				2	2	10/16/2002	2	2	1/31/2003	2	2	4/25/2003
BRIDGE REPLACEMENT(P)	0.1	$60,000	11/15/2006				3	3	3/14/2007	2	2	8/31/2007	2	2	9/28/2007
BRIDGE REPLACEMENT(P)	0.1	$80,000	3/23/2007				3	3	4/4/2007	2	2	9/25/2007	2	2	10/31/2007
BRIDGE REPLACEMENT(P)	0.1	$30,000	8/3/2009	$30,000	10/31/2007		3	3	12/17/2008	3	3	9/30/2009	3	3	10/23/2009
BRIDGE REPLACEMENT(P)	0.1	$90,000	5/5/2008	$90,000	10/31/2007		3	3	6/4/2008	2	2	3/19/2009	2	2	5/22/2009
BRIDGE REPLACEMENT(P)	0.1	$60,000	8/27/2008	$60,000	10/31/2007		3	3	6/18/2008	3	3	3/30/2009	3	2	6/30/2009
BRIDGE REPLACEMENT(P)	0.1	$25,000	11/15/2006				3	3	3/21/2007	2	2	7/5/2007	2	2	4/23/2008
BRIDGE REPLACEMENT(P)	0.04	$55,000	12/4/2013	$55,000	11/1/2013		3	3	1/8/2014	3	0		3	0	
NEW ROUTE(O)	2	$799,315	10/25/2005				4	4	12/8/2005	4	4	10/18/2007	4	3	1/31/2008
RECONSTRUCTION(O)	0.68	$500,000	6/8/2005				4	4	8/10/2005	3	3	1/31/2007	3	3	5/31/2007
BRIDGE REPLACEMENT(P)		$160,000	11/29/2007	$160,000	11/1/2007		3	3	4/15/2009	2	1	2/28/2010	3	1	5/31/2010
SAFETY(P)	0.15	$95,000	11/19/2002				4	4	5/7/2003	4	4	2/17/2004	4	4	8/31/2005
SAFETY(P)		$115,000	3/6/2003				6	6	4/23/2003	2	2	8/31/2005	2	2	10/31/2005
SAFETY(P)	0.5	$700,000	6/11/2007				4	4	8/3/2010	4	3	4/30/2011	4	4	5/20/2011
RECONSTRUCTION(O)	0.1	$80,000	5/14/2009	$80,000	12/5/2007		3	3	6/24/2009	2	2	1/29/2010	2	2	2/19/2010
RECONSTRUCTION(O)	2.806	$2,860,000	1/3/2014	$2,860,000	11/7/2013		4	0		4	0		4	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY-HAZARD ELIM(P)	0.3	$80,000	7/28/2011	$375,000	11/10/2009		3	3	11/2/2011	3	0	2/28/2012	3	0	4/30/2012
SAFETY(P)		$40,000	10/20/2009				4	4	11/29/2009	1	1	5/15/2010	4	2	5/28/2010
RELOCATION(O)		$100,000	2/8/2011				5	5	3/23/2011	4	3	9/23/2011	4	0	12/31/2011
REST AREA REHAB(P)		$15,000	11/17/1993				2	0		2	0		2	0	
REST AREA REHAB(P)		$100,000	11/17/1993				2	2	1/6/1994	2	0		2	0	
REST AREA REHAB(P)	1.1	$2,280,000	4/8/2004				6	6	9/21/2001	6	0		6	0	
MAJOR WIDENING(O)	4.2	$941,000	11/26/2013	$100,000	1/1/2014										
MAJR WIDENING	2.93						6	6	9/15/1988	6	6		6	3	11/30/1990
MAJOR WIDENING(O)	2.85	$160,000	11/22/1993				3	3	3/8/1994	3	3		3	2	
RELOCATION(O)	3.5	$562,393	11/2/2004				7	7	8/24/2001	7	7		7	6	
GRADE & DRAIN	4	$400,000	5/24/1994				3	3	6/24/1994	3	1		3	0	
MAJOR WIDENING(O)	1.5	$25,000	10/1/1998				2	0		2	0		2	0	
MAJOR WIDENING(O)	1.2	$2,500,000	4/26/2007												
MAJOR WIDENING(O)	8.7	$2,000,000	11/12/1997				7	7	1/6/1998	7	0		7	0	
MAJOR WIDENING(O)	0.8	$400,000	4/26/1994				7	7	6/29/1993	7	6		7	0	
NEW ROUTE(O)	0.3	$570,000	3/20/2002				6	6		5	5		5	5	
RECONSTRUCTION(O)	7.2	$1,146,754	3/27/2003				5	5	1/19/2000	5	5		5	2	
RECONSTRUCTION(O)	0.2	$150,000	5/24/2001												
RECONSTRUCTION(O)	0.5	$8,450	5/22/2002												
RECONSTRUCTION(O)	0.47	$140,000	6/14/2005				4	4		4	3		4		
NEW ROUTE(O)	3	$865,000	2/19/2008				7	7		7	4		7	2	
NEW INTERCHANGE(O)	0.1	$225,000	11/8/2004				6	6		4	4		4	4	
MAJOR WIDENING(O)	1	$746,000	8/10/2009				5	5		2	2		2	1	
NEW ROUTE(O)	1	$2,389	3/17/2009	$0	10/17/2007		1	1		1	1		1		
SAFETY(P)		$85,000	10/20/2003												
NEW ROUTE(O)	1.3	$930,000	11/20/2008	$365,000	10/17/2007		5	5		5	5		5	5	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RECONSTRUCTION(O)	1	$250,000	4/9/2007												
MINOR WIDENING(O)	1.5	$220,000	10/19/1992				5	5		5	5		5	0	
BRIDGE REPLACEMENT(P)	0.1	$25,000	8/24/1990				2	2		2	2		2	1	5/31/1991
BRIDGE REPLACEMENT(P)	0.1	$60,000	10/6/1994				3	3	4/25/1994	3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$10,000	9/7/1990				1	1		1	1		1	1	
NEW ROUTE(O)	3.1	$1,536,000	11/22/1993				4	4		4	1		4	0	
NEW ROUTE(O)	0.97	$200,000	6/24/1993				3	3	9/25/1990	3	3		3	1	
NEW ROUTE(O)	3.22	$150,000	6/24/1993				6	6		6	5		6	0	
NEW ROUTE(O)	2.31	$0	9/13/1993				1	1		1	1		1	1	
MAJOR WIDENING(O)	1.9	$160,000	8/6/1993				3	3	8/24/1992	3	3		3	0	
MAJR WIDENING	1.6						3	3	6/14/1991	3	3		3	0	
SAFETY	0.4						3	3	4/26/1991	3	3		3	0	
MAJOR WIDENING(O)	6.5	$960,000	10/11/1990				6	6	11/29/1990	6	6		6	0	
MINOR WIDENING(O)		$260,000	5/26/1993				4	4	3/9/1992	4	4		4	4	
MAJOR WIDENING(O)	0.7	$168,253	1/25/2005				4	4	5/31/1996	4	4		4	0	
MAJOR WIDENING(O)	0.6	$600,000	11/22/1996				5	5	12/16/1996	5	4		5	1	
MAJOR WIDENING(O)	3.5	$1,160,000	11/22/1996				8	8	1/6/1997	8	7		8	2	
SAFETY	0.1	$75,000	6/19/1995				6	6	1/20/1995	6	6		6	2	
MAJOR WIDENING(O)	1.781	$536,488	11/28/2005				7	7	5/8/1998	7	2		7	0	
SAFETY	0.1	$20,000	10/19/1994				2	2		2	2		2	2	
RELOCATION(O)	1	$880,000	11/6/2002				4	4		4	3		4	0	
SAFETY	0.25	$85,000	10/20/1995				3	3		3	2		3	0	
MAJOR WIDENING(O)	0.7	$425,000	3/30/2000												
I-CHANGE RECONST(O)	0.4	$6,457	12/29/2004				4	0		4	0		4	0	
RECONSTRUCTION(O)	3.76	$2,600,000	5/26/2006				6	6		5	5		5		
RECONSTRUCTION(O)	2.24	$2,078,784	3/1/2010				4	4		4	4		4	4	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RECONSTRUCTION(O)	2.8	$1,495,000	3/22/2010				6	6		6	6		6	6	
RECONSTRUCTION(O)	1.1	$450,000	6/10/2009				4	4		2	2		2	1	
MINOR WIDENING(O)	1.2	$1,140,000	3/24/2009				5	5		4	4		4	3	
NEW ROUTE(O)	0.38	$35,000	9/8/1992				5	5	7/23/1992	5	5		5	1	
NEW ROUTE(O)	2.1	$802,125	6/6/2005				5	0		5	0		5	0	
NEW ROUTE(O)	3.3	$730,000	7/5/1989				6	6		6	6		6	4	8/15/1991
BRIDGE REPLACEMENT(P)	2.1	$50,000	2/5/1986				3	3	4/30/1986	3	3		3	3	6/11/1987
NEW ROUTE(O)	1.54	$405,000	6/6/1994				8	8	6/13/1994	8	8		8	0	
MINR WIDENING	0.66						4	4		4	0		4	0	
MAJOR WIDENING(O)	4.1	$625,000	9/11/1997				5	5	10/1/1997	5	0		5	0	
MAJOR WIDENING(O)	3.5	$477,856	6/30/2005				3	3	3/17/1998	3	0		3	0	
NEW INTERCHANGE(O)	0.1	$125,000	4/3/1995				5	5	6/21/1995	5	5		5	3	
NEW ROUTE(O)	1.2	$20,000	7/15/1991				4	4		4	4		4	0	
I-CHANGE RECONST(O)	0.5	$16,138	3/11/1999				1	1	8/23/1995	1	1	12/11/1995	1	0	
MINOR WIDENING(O)	1	$560,000	3/19/1997				5	5	7/30/1996	5	3		5	0	
RECONSTRUCTION(O)	4.6	$200,000	11/23/1997				9	9	2/1/1999	9	0		9	0	
MAJOR WIDENING(O)	1.2	$612,114	6/14/2005				8	8	3/11/1997	8	8		8	8	
NEW ROUTE(O)	7.8	$1,150,000	2/3/2000				7	7	4/13/2000	7	7		7	7	
RELOCATION(O)	3.07	$780,000	3/22/2010				5	5		4	3		4		
RELOCATION(O)	0.6	$50,000	4/22/1997				4	4	8/11/1997	4	4		4	3	
RECONSTRUCTION(O)		$30,000	8/1/1994				5	5	8/11/1994	5	5		5	0	
MAJOR WIDENING(O)	2.8	$260,000	6/26/1998				4	4	3/26/1997	4	0		4	0	
MAJOR WIDENING(O)	1.4	$250,576	4/6/2005				4	0		4	0		4	0	
NEW ROUTE(O)	1.8	$606,000	5/9/2011	$450,000	11/2/2007		8	8		8	5		8		
NEW ROUTE(O)	3.5	$650,000	4/7/2009	$575,000	11/2/2007		6	6		6	2		6		
NEW ROUTE(O)	2.4	$2,175,000	12/14/2011	$775,000	11/2/2007		6	6		6			6		

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
NEW ROUTE(O)	4.4	$3,400,000	3/4/2013	$2,100,000	1/28/2011										
RECONSTRUCTION(O)	1.5	$150,000	7/27/1998				4	4	9/21/1998	4	0		4	0	
RECONSTRUCTION(O)	0.1	$61,500	5/7/1997				5	5	1/6/1997	5	5		5	1	
NEW ROUTE(O)	3	$850,000	1/12/2011				6	6		6	6		6	4	
RECONSTRUCTION(O)	1.2	$320,000	12/29/2004				4	4		3	3		3	2	
RECONSTRUCTION(O)	1.5	$975,000	4/25/2005				5	5	11/28/2001	5	5		5	2	
SAFETY-HAZARD ELIM(P)	0.3	$50,000	2/4/2008	$50,000	10/29/2007										
SAFETY-HAZARD ELIM(P)	0.2	$390,000	2/4/2008				5	5		5			5		
SAFETY-HAZARD ELIM(P)	0.1	$160,000	4/9/2009	$150,000	2/18/2009		7	7		6	1		6		
SAFETY-HAZARD ELIM(P)	2.65	$22,696	2/8/2005												
SAFETY-HAZARD ELIM(P)	0.2	$82,098	3/24/2005				6	0		6	0		6	0	
SAFETY-HAZARD ELIM(P)	0.3	$43,104	4/27/2004				6	6	10/5/2001	6	0		6	0	
SAFETY-HAZARD ELIM(P)	0.1	$40,000	6/21/2004				3	3		1	1		1	1	
SAFETY-HAZARD ELIM(P)	0.3	$50,000	6/21/2004				4	4		0	0		1	1	
SAFETY-HAZARD ELIM(P)	0.1	$25,000	12/1/2005				1	1		1	1		1		
SAFETY-HAZARD ELIM(P)	1	$389,750	8/23/2005				6	6		5	4		5		
MAJR WIDENING	1.8						6	6	3/27/1990	6	6		6	1	8/1/1991
MAJOR WIDENING(O)	1.34						4	4	1/2/1990	4	4		4	4	
SAFETY-HAZARD ELIM(P)	0.2	$35,000	11/12/1997				5	0		5	0		5	0	
SAFETY(P)	0.4	$25,000	11/25/1998				5	5	1/6/1999	5	3		5	3	
SAFETY(P)	0.4	$100,000	7/23/2003				3	3		2	2		2	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	4/26/1993				1	1	5/19/1993	1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$70,000	3/9/1993				3	3	5/19/1993	3	3		3	0	
BRIDGE REPLACEMENT(P)	0.1	$60,614	3/7/2005												
BRIDGE REPLACEMENT(P)	0.1	$50,000	3/20/2003												
BRIDGE REPLACEMENT(P)	0.1	$10,000	4/19/1991				2	2		2	2		2	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$10,000	9/4/1992				2	2	1/4/1993	2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$30,000	4/3/1995				3	3	5/11/1995	0	0		0	0	
NEW ROUTE(O)	0.513	$190,376	2/1/2005				5	5	1/8/1997	5	5		5	1	
NEW ROUTE(O)	4.8	$845,000	10/30/1997				7	7	12/17/1997	7	6		7	6	
OTHR HWY IMP		$30,000	4/25/1990				2	2		2	2		2	0	1/11/1991
BRIDGE REPLACEMENT(P)	0.1	$20,000	2/25/1998				2	2	4/14/1997	2	2	3/24/1998	2	2	9/3/1998
BRIDGE REPLACEMENT(P)	0.1	$85,000	3/21/1995				5	5	6/12/1995	5	5		5	0	
BRIDGE REPLACEMENT(P)	0.1	$20,000	8/18/1995				2	2	8/23/1995	2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$10,000	11/17/1995				2	2	12/5/1995	2	2		2	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	9/15/1995				2	2	9/22/1995	2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$5,000	10/24/1995				1	1	11/6/1995	1	1		1	0	
BRIDGE REPLACEMENT(P)	0.1	$30,214	11/2/2004				2	2	1/24/2002	2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$751,889	12/1/2004				5	5	5/2/1997	6	4		6	2	
BRIDGE REPLACEMENT(P)	0.112	$30,000	5/15/1998				7	7	6/25/1999	7	7		7	6	
BRIDGE REPLACEMENT(P)	0.114	$50,000	2/17/1999				3	3	7/28/1999	3	3		3	0	
BRIDGE REPLACEMENT(P)	0.1	$25,000	11/22/1996				1	1	12/3/1996	1	1		1	1	7/10/1997
BRIDGE REPLACEMENT(P)	0.1	$100,000	11/30/1999				8	8	1/24/2000	8	0		8	0	
BRIDGE REPLACEMENT(P)	0.1	$10,000	8/26/1999				1	0		1	0		1	0	
BRIDGE REPLACEMENT(P)	0.1	$10,000	9/20/1996				1	0		1	0		1	0	
BRIDGE REPLACEMENT(P)	0.1	$20,000	11/19/1997				2	0		2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$51,959	8/6/2004												
BRIDGE REPLACEMENT(P)	0.1	$30,000	2/2/2005				3	3		0	0		1	1	
BRIDGE REPLACEMENT(P)	0.1	$36,721	6/16/2005				3	3		1	1		1		
BRIDGE REPLACEMENT(P)	0.1	$80,000	3/20/2006				3	3		2	2		2		
BRIDGE REPLACEMENT(P)	0.1	$170,000	6/29/2012	$150,000	4/4/2011										
BRIDGE REPLACEMENT(P)	0.1	$400,000	11/5/2012												

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
LANDSLIDE REPAIR(P)		$85,000	8/19/1997												
LANDSLIDE REPAIR(P)	1	$30,000	6/8/2005				3	3		0			2	2	
RELOCATION(O)	2.1	$700,000	10/19/2010				7	7		6	6		7	1	
NEW ROUTE(O)		$1,400,000	11/18/2005				6	6		4	4		4	2	
SAFETY(P)	0.2	$600,000	5/20/2013												
RECONSTRUCTION(O)		$2,250,000	4/28/2006				7	7		6	4		7		
I-CHANGE RECONST(O)	0.8	$370,000	3/1/2002				5	0		5	0		5	0	
MAJOR WIDENING(O)	4	$1,715,471	4/25/2005				8	8		3	3		7	2	
BYPASS(O)		$885,000	8/13/2002				6	1		6	1		6	0	
SAFETY(P)		$317,141	3/23/2005				2	2		3	2		3	1	
NEW ROUTE(O)		$2,325,000	1/10/2012	$1,000,000	11/2/2007		7	7		7	3				
NEW ROUTE(O)		$650,000	1/10/2012	$350,000	11/2/2007		9	9		9			9		
NEW ROUTE(O)		$2,900,000	3/1/2012	$399,000	9/15/2009										
NEW ROUTE(O)		$1,250,000	9/27/2010	$1,250,000	7/7/2009		6	6		9	3		6		
DESIGN ENGINEERING(O)		$0	12/2/2011												
PAVEMENT REHAB-PRI(P)		$175,000	12/14/2011												
DESIGN ENGINEERING(O)		$150,000	3/30/2011												
REST AREA REHAB(P)		$250,000	4/27/1988				0	0		0	0		0	0	
REST AREA REHAB(P)		$273,000	3/30/1993				2	2	4/1/1993	2	1	7/6/1993	2	0	
REST AREA REHAB(P)		$816,000	1/30/1993				4	4	5/28/1993	4	0		4	0	
NEW INTERCHANGE(O)		$123,435	4/12/2001				5	5	10/25/1995	5	2	12/11/1996	5	0	
GRADE DRAIN & SURFAC	1.59						0	0	2/23/1983	0	0		0	0	
MAJR WIDENING	1.11						6	6	11/20/1989	6	6		6	0	7/1/1991
MAJOR WIDENING(O)	1.2						6	6		6	6		6	5	3/1/1992
NEW INTERCHANGE(O)	0.1	$5,027,000	4/24/2008	$620,000	11/1/2007		7	7	6/27/1996	7	0		7	0	4/15/2007
MAJOR WIDENING(O)	1	$1,860,000	3/1/1995				7	7	3/17/1995	7	0		7	0	2/15/2007

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	0.5	$560,000	4/29/2004				7	7	3/17/1995	7	0		7	0	11/15/2004
NEW INTERCHANGE(O)		$287,240	6/23/2004				4	4	3/13/1992	4	4		4	2	
I-CHANGE RECONST(O)	0.3	$185,000	11/29/2010	$350,000	11/5/2007		7			7			7		
RECONSTRUCTION(O)	2.2	$715,000	9/7/2011	$1,000,000	11/2/2007										
I-CHANGE RECONST(O)	0.2	$2,015,000	9/1/2011	$5,200,000	10/6/2009		7			7			7		
PAVEMENT REHAB-INT(P)	0.3	$200,000	4/3/1995				6	5	4/24/1995	6	0		6	0	
MAJOR WIDENING(O)	12.7	$1,220,000	9/15/2009	$3,000,000	11/6/2007										
NEW ROUTE(O)	0.7	$2,546,380	3/1/2010				5	5	4/26/1991	5	1		5	0	9/15/2001
MAJOR WIDENING(O)	2.5	$1,250,000	8/14/1991				7	5	10/2/1991	7	4		7	1	
MAJR WIDENING	1.22	$147,000	12/22/1988				7	7	2/1/1989	7	7		7	4	8/1/1991
SFTY TE IMPR		$195,000	9/27/1994				5	5	7/14/1988	5	0		5	0	
SAFETY	0.24	$75,000	9/26/1989				5	5	2/1/1990	5	5		5	1	7/24/1992
BRIDGE REPLACEMENT(P)	0.1	$244,000	11/16/1990				5	5	1/27/1989	5	5		5	4	5/1/1991
NEW ROUTE(O)	0.8	$294,000	10/19/1992				5	5		5	3		5	1	
SAFETY		$76,500	4/19/1991				5	5	10/1/1991	5	5		5	3	
CONGESTION MITIGTN(O)		$25,000	12/1/1989				5	5		5	5		5	5	
MINOR WIDENING(O)	0.4	$50,000	5/3/1996				6	0		6	0		6	0	3/1/1999
SFTY TE IMP		$35,000	6/15/1990				4	4	8/14/1990	4	4		4	3	7/19/1991
MAJOR WIDENING(O)	0.9	$300,000	1/14/1997				5	5	1/24/1997	5	0		5	0	5/15/1998
MAJOR WIDENING(O)	2	$3,600,000	4/14/1998				7	0		7	0		7	0	10/15/2002
MAJOR WIDENING(O)	2.2	$2,121,081	1/31/2002				6	6	11/14/1997	6	0		6	0	3/15/2002
GRADE DRAIN & SURFAC	0.77						5	0		5	0		5	0	
REST AREA REHAB(P)		$100,000	2/7/1991				5	5	12/5/1988	5	5		5	5	
MAJOR WIDENING(O)	2	$1,225,000	6/14/1994				7	7	8/26/1994	7	5		7	1	11/6/1995
MAJOR WIDENING(O)	5.4	$4,720,000	8/21/2006				9	0		9	0		9	0	
MAJOR WIDENING(O)	3.69	$2,500,000	5/3/1994				6	6	7/20/1992	6	2		6	2	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	2.25	$756,000	12/17/1993				8	8	3/4/1991	8	3		8	2	
MAJOR WIDENING(O)	2.5	$213,583	3/7/2005				6	6	12/16/1991	6	3	3/20/1996	6	1	6/23/1993
SAFETY(P)		$15,000	12/23/2008												
MAJR WIDENING	0.57	$400,000	11/18/1993				6	6	4/10/1989	6	6		6	0	
SAFETY(P)	0.1	$15,000	11/24/1998												
BRIDGE REPLACEMENT(P)	0.1	$40,000	7/2/1992				1	1	9/4/1992	1	1	6/3/1996	1	0	
BRIDGE REPLACEMENT(P)	0.1	$5,000	9/3/1993				4	4	3/27/1995	4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$59,000	7/12/1991				5	5		5	5		5	2	
BRIDGE REPLACEMENT(P)	0.6	$100,000	4/5/2010	$3,000,000	12/20/2007										
SAFETY(P)	0.3	$85,000	1/31/2007				0	0		0	0		0	0	5/15/2005
SAFETY(P)	0.2	$101,000	4/25/2005				6	3		6	0		6	0	6/15/2005
MAJOR WIDENING(O)	3.54	$315,000	11/7/2006				4	4	8/11/1993	4	3	11/2/1995	4	0	
MAJOR WIDENING(O)	2.3	$915,000	7/13/1993				7	7	8/12/1993	7	3	11/2/1995	7	0	
NEW ROUTE(O)	3.9	$1,023,000	6/30/1988				5	5	7/28/1988	5	5		5	1	2/15/1991
BRIDGE REPLACEMENT(P)	0.33	$138,000	1/16/1991				4	4	2/12/1991	4	4		4	1	6/1/1992
MINR WIDENING		$30,000	8/24/1987				6	6	9/28/1987	6	6		6	2	6/1/1991
SFTY TE IMPR		$5,000	4/8/1987				6	6	2/29/1988	6	6		6	6	4/1/1991
BRIDGE REPLACEMENT(P)	0.2	$169,000	9/26/1989				3	3		3	3		3	3	1/1/1991
RELOCATION(O)	0.35	$250,000	6/17/1994				6	6	1/2/1992	6	4	3/20/1996	6	0	
SFTY TE IMPR		$93,000	10/29/1990				5	5	1/8/1988	5	5		5	5	4/19/1991
SFTY TE IMPR		$238,500	4/8/1987				5	5	1/8/1988	5	5		5	5	11/15/1991
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/16/1995				5	0	12/5/1995	2	1	6/3/1996		0	
BRIDGE REPLACEMENT(P)	0.1	$45,000	7/9/1996				3	3	5/5/1995	2	2	6/3/1996	2	1	8/30/1996
SFTY TE IMPR		$142,900	6/29/1994				5	5	1/12/1989	5	5		5	5	4/19/1991
CONGESTION MITIGTN(O)		$362,000	9/17/1993				7	7	1/12/1989	7	6		7	3	8/14/1996
SAFETY	0.215	$250,000	9/13/1991				5	5	1/12/1989	5	1		5	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SFTY TE IMPR		$115,600	5/21/1991				5	5	1/5/1988	5	5		5	4	7/1/1991
SFTY TE IMPR		$107,000	10/11/1990				5	5	1/5/1988	5	5		5	2	6/1/1991
SAFETY	0.1	$76,000	3/24/1993				5	5	4/11/1993	5	0		5	0	
SFTY TE IMPR		$113,000	7/21/1987				5	5	8/12/1987	5	5		5	5	1/1/1990
CONGESTION MITIGTN(O)		$42,500	1/3/1989				5	5	1/12/1989	5	5		5	5	12/1/1991
NEW ROUTE(O)	2.13	$60,000	1/26/1993				2	2		2	1		2	0	
NEW ROUTE(O)	2.8	$475,000	8/25/1992				5	5	9/17/1992	5	3		5	0	
NEW ROUTE(O)	2.6	$217,349	7/12/2005												
SAFETY-HAZARD ELIM(P)	0.1	$75,000	9/8/1994				5	5		5	0		5	0	
BRIDGE REPLACEMENT(P)	0.3	$0	6/5/1991				4	0		4	0		4	0	
RELOCATION(O)	0.6	$100,975	11/28/2005				5	5	10/30/1997	5	0		5	0	10/15/1998
MINOR WIDENING(O)		$35,000	3/25/1997				5	5		5	0		5	0	
UNKNOWN		$55,000	6/27/1996				0	0		0	0		0	0	
MINOR WIDENING(O)	0.8	$340,000	5/26/1998				6	0		6	0		6	0	7/15/2000
RECONSTRUCTION(O)	1.2	$100,000	3/25/1997				5	5		5	0		5	0	10/15/1998
MAJOR WIDENING(O)	2.4	$4,030,000	10/22/2004				6	0		6	0		6	0	10/15/2006
RELOCATION(O)	6.6	$800,000	6/18/1993				4	4	2/5/1991	4	4		4	4	
RELOCATION(O)	2.9						3	3	11/5/1992	3	1		3	0	
MAJR WIDENING	1.6	$450,000	12/24/1991				6	6		6	6		6	3	7/1/1991
MAJOR WIDENING(O)	1.8	$1,600,000	6/26/1998				6	6	5/19/1998	6	0		6	0	11/1/2002
SAFETY-HAZARD ELIM(P)		$110,000	9/12/1994				5	5		5	0		5	0	
BRIDGE REPLACEMENT(P)	0.1	$135,000	6/17/1996				6	6	6/26/1996	6	1	8/12/1997	6	0	6/15/1998
MAJOR WIDENING(O)	1.4	$1,100,000	2/15/1994				5	5	1/26/1994	5	5		5	0	9/15/1998
SFTY TE IMPR		$0	6/18/1992				0	0		0	0		0	0	
MINOR WIDENING(O)	1.03	$409,000	12/17/1993				7	7	8/30/1990	7	5		7	2	
NEW ROUTE(O)	0.8	$1,300,000	6/6/2000				7	0		7	0		7	0	9/1/2001

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY(P)	0.426	$155,000	8/24/2012	$50,000	11/21/2011										
NEW ROUTE(O)	1.2	$712,000	9/8/1992				9	9		9	5		9	1	
SFTY TE IMPR							5	5	8/5/1987	5	4		5	0	1/1/1989
SAFETY(P)	0.5	$110,000	5/28/2010				7	7	2/6/2009		0			0	
BRIDGE REPLACEMENT(P)	0.057	$0	3/11/1995				0	0		0	0		0	0	
REST AREA REHAB(P)	0.04	$25,000	8/7/1989				0	0		0	0		0	0	
NEW ROUTE(O)	1.09	$166,400	10/12/1993				5	5		5	5		5	0	12/15/1991
NEW ROUTE(O)	1.17	$159,000	12/17/1993				4	4		4	2		4	0	
NEW ROUTE(O)	0.6	$1,155,000	11/21/1997				6	6	12/3/1997	6	0		6	0	5/1/1999
NEW ROUTE(O)	0.5	$435,000	11/24/1997				6	6	12/3/1997	6	0		6	0	3/15/1999
NEW ROUTE(O)	0.717	$180,000	9/13/1996				6			6			6		
NEW ROUTE(O)	1.3	$700,000	9/10/1996				6	6	9/17/1996	6	1		6	0	
MAJOR WIDENING(O)	0.9	$410,000	12/14/1995				6	6	12/22/1995	6	1	10/10/1995	6	0	
GRADE DRAIN & SURFAC	1.9	$1,048,500	8/22/1991				6	0		6	0		6	0	
NEW ROUTE(O)	0.5						6	6	1/5/1990	6	6		6	1	
MINOR WIDENING(O)	0.3	$70,000	8/30/1996				5	5	9/12/1996	5	0		5	0	
NEW ROUTE(O)	0.28	$180,000	10/19/1992				0	0		0	0		0	0	
RESTOR REHAB		$15,000	9/13/1991				0	0		0	0		0	0	
MAJOR WIDENING(O)	2.3	$3,915,000	2/26/2007				6	0		6	0		6	0	10/15/2007
NEW ROUTE(O)	0.5	$500,000	5/18/2006												8/15/2006
RECONSTRUCTION(O)	1.2	$200,000	8/17/1999				3	0		3	0		3	0	2/1/2001
RECONSTRUCTION(O)	0.1	$100,000	4/23/1997				5	0		5	0		5	0	
NEW ROUTE(O)		$233,000	3/22/1999				5	0		5	0		5	0	
NEW ROUTE(O)		$52,500	12/19/1995				0	0		0	0		0	0	
NEW ROUTE(O)		$15,000	12/19/1995				0	0		0	0		0	0	
NEW ROUTE(O)		$7,500	12/19/1995				0	0		0	0		0	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFTEY		$30,000	5/13/1993				4	4		4	4		4	0	
RECONSTRUCTION(O)		$150,000	10/16/2001												10/15/2002
INDUSTRIAL ACCESS		$115,000	5/26/1993				5	5		5	3		5	0	
SAFETY(P)	0.52	$1,155,000	10/2/2008				7	7	2/6/2009	7	0	2/6/2009		0	
MINOR WIDENING(O)	0.2	$810,000	10/2/2008												
NEW ROUTE(O)	3.3	$4,333,035	5/19/2005				6	6	3/12/1998	6	0		6	0	7/15/2002
SAFETY(P)	2.6	$10,000	3/22/2010												
MAJOR WIDENING(O)	2.5	$2,000,000	9/15/2000				7	0	4/27/1994	7	0		7	0	4/15/2006
NEW ROUTE(O)	4.5	$3,170,000	8/5/2002				8	0		8	0		8	0	7/15/2006
CONGESTION MITIGTN(O)	0.3	$5,000	6/7/1999												
SAFETY-HAZARD ELIM(P)	0.1	$302,753	11/18/2004				5			5			5		5/19/2000
MINOR WIDENING(O)	0.36	$4,411	3/7/2005												8/15/2001
WEIGH STA REHAB(P)	1.1	$500,000	4/12/2002				0	0		0	0		0	0	
RECONSTRUCTION(O)	0.8	$985,000	10/18/1995				6	6	6/6/1996	6	1	8/21/1997	6	0	11/15/1998
MINOR WIDENING(O)	0.85	$1,365,000	6/6/2013	$277,000	6/1/2009										
SAFETY-HAZARD ELIM(P)	0.1	$50,000	8/13/1997				5	5	9/25/1997	5	0		5	1	11/1/1998
SAFETY		$15,000	3/28/1996				0	0		0	0		0	0	
SAFETY(P)	0.5	$130,000	6/9/2010	$125,000	10/26/2009										
SAFETY(P)	0.2	$615,000	6/9/2010	$660,000	10/26/2009										
MAJOR WIDENING(O)	1	$310,000	10/14/1999				6			6			6		10/1/2001
MAJOR WIDENING(O)	0.9	$375,000	9/8/1999				6			6			6		10/1/2001
MAJOR WIDENING(O)	1	$511,597	7/20/2009				6			6			6		10/1/2001
RECONSTRUCTION(O)	0.94	$500,000	1/22/2009				8	8	1/22/2009	8	8	1/22/2009	8	0	2/10/2009
SAFETY(P)		$16,500	4/2/2008												
NEW ROUTE(O)	0.6	$850,000	9/18/2009	$961,538	2/14/2008										
MINOR WIDENING(O)	1.8	$1,800,000	9/20/2013				6	6		6	0		6	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MINOR WIDENING(O)	1	$93,287	9/18/2006												12/15/2006
BRIDGE REHAB(P)	0.1	$116,000	3/21/2007												
BRIDGE REPLACEMENT(P)		$40,000	11/19/2003												7/15/2004
MINOR WIDENING(O)	0.6	$160,000	5/2/2001				6	0		6	0		6	0	9/15/2002
RECONSTRUCTION(O)		$20,000	9/21/1999				6	0		6	0		6	0	
RECONSTRUCTION(O)	0.7	$90,000	8/11/1999				6	0		6	0		6	0	12/15/1999
RECONSTRUCTION(O)	0.3	$210,000	8/4/2000				6	0		6	0		6	0	6/15/2001
RECONSTRUCTION(O)		$5,000	4/6/1999				6	0		6	0		6	0	
SAFETY(P)		$50,000	3/22/2010												
MATCHED FED FUNDS(O)		$275,000	10/29/2012	$150,000	1/18/2012										
RECONSTRUCTION(O)	0.81	$2,000,000	2/4/2013												
I-CHANGE RECONST(O)		$1,271,008	4/15/2013	$6,840,000	12/20/2007										
NEW ROUTE(O)		$1,000,000	10/15/2010	$1,220,000	12/20/2007										
I-CHANGE RECONST(O)		$65,000	4/27/2012												
SAFETY-HAZARD ELIM(P)	0.5	$135,000	3/3/2005												5/15/2005
SAFETY-HAZARD ELIM(P)	0.3	$57,167	8/21/2012	$40,000	5/13/2008										
BRIDGE REPLACEMENT(P)	0.335	$10,000	9/3/1993				1	1		1	1		1	1	
SAFETY-HAZARD ELIM(P)	0.2	$105,000	10/29/1998				5	0		5	0		5	0	7/15/2000
SAFETY(P)	0.7	$43,419	10/22/2004				5	0		5	0		5	0	12/31/1999
SAFETY-HAZARD ELIM(P)	0.8	$38,759	6/30/2005				5	0		5	0		5	0	4/15/2001
SAFETY-HAZARD ELIM(P)	0.5	$110,000	2/5/1998				5	0		5	0		5	0	6/15/1999
SAFETY-HAZARD ELIM(P)	0.5	$10,000	4/14/1998				5	0		5	0		5	0	5/15/1999
SAFETY-HAZARD ELIM(P)	0.4	$30,000	1/23/1998				5	0		5	0		5	0	6/1/1999
SAFETY-HAZARD ELIM(P)	1	$40,000	1/23/1998				6	6	11/20/1999	6	0		6	0	11/20/1999
SAFETY-HAZARD ELIM(P)	0.4	$20,000	8/25/1997				5	5	9/26/1997	5			5		2/15/1998
SAFETY-HAZARD ELIM(P)	0.1	$20,000	8/19/1997				5	5	10/23/1997	5			5		5/1/1998

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY-HAZARD ELIM(P)	0.3	$95,000	1/23/1998				6	6	2/11/1998	6	0		6	0	
SAFETY-HAZARD ELIM(P)	0.1	$22,000	6/2/2003												5/15/2005
SAFETY-RR SEPARATN(P)		$86,254	12/30/2004				4	4	7/11/1995	4	4	11/20/1996	4	0	
MAJOR WIDENING(O)		$450,000	1/2/1992				11	11	10/6/1988	11	11		11	9	
BRIDGE REPLACEMENT(P)	0.1	$10,000	8/3/1990				2	2	9/26/1990	2	2		2	1	5/1/1991
SAFETY-HAZARD ELIM(P)	0.6	$325,000	12/22/2011												9/15/2006
BRIDGE REPLACEMENT(P)	0.1	$50,000	5/15/1998				6	6	7/7/1998	6	0		6	0	3/1/2001
BRIDGE REPLACEMENT(P)	0.1	$11,476	6/4/2002				5	0	1/11/1999	5	0		5	0	5/15/2001
BRIDGE REPLACEMENT(P)	0.1	$105,000	1/22/1997				5	5	12/9/1996	5	0		5	0	7/30/1998
BRIDGE REPLACEMENT(P)	0.1	$60,000	2/15/1996				4	4	3/18/1997	4	0		4	0	2/15/1998
BRIDGE REPLACEMENT(P)	0.1	$80	3/7/2005				1	0		1	0		1	0	10/1/1998
BRIDGE REPLACEMENT(P)	0.1	$40,000	4/22/1996				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$60,000	4/9/1998				5			5	0		5	0	4/15/2001
BRIDGE REPLACEMENT(P)	0.1	$45,558	11/28/2005				6	6	7/7/1998	6	0		6	0	6/15/1999
BRIDGE REPLACEMENT(P)	0.1	$75,000	8/1/1997				5	5	8/28/1997	5	0		5	0	3/15/1998
BRIDGE REPLACEMENT(P)	0.1	$175,000	12/28/2000				6	0		6	0		6	0	5/15/2002
BRIDGE REPLACEMENT(P)	0.1	$50,000	5/2/2001				0	0		0	0		0	0	5/15/2002
BRIDGE REPLACEMENT(P)	0.1	$35,000	10/30/2006												5/15/2005
BRIDGE REPLACEMENT(P)	0.1	$15,000	7/3/2002										2	2	6/15/2002
BRIDGE REPLACEMENT(P)	0.1	$320,000	3/17/2005												6/15/2005
BRIDGE REPLACEMENT(P)	0.1	$20,000	3/20/2003												6/15/2004
BRIDGE REPLACEMENT(P)	0.1	$300,000	11/8/2005												4/15/2006
BRIDGE REPLACEMENT(P)	0.1	$60,000	4/28/2004												4/15/2004
BRIDGE REPLACEMENT(P)	0.1	$100,000	9/20/2006												3/15/2007
BRIDGE REPLACEMENT(P)	0.635	$800,000	8/23/2005												9/15/2007
BRIDGE REPLACEMENT(P)	0.1	$100,000	8/4/2006												

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$85,000	5/16/2005												4/15/2006
BRIDGE REPLACEMENT(P)	0.1	$65,000	11/30/2006												
BRIDGE REPLACEMENT(P)	0.1	$120,000	10/27/2008	$150,000	11/18/2007										
BRIDGE REPLACEMENT(P)	0.1	$100,000	7/10/2008	$200,000	12/20/2007										
BRIDGE REPLACEMENT(P)	0.1	$45,000	8/18/2008	$35,000	12/20/2007										
BRIDGE REPLACEMENT(P)	0.1	$75,000	11/2/2009	$65,000	12/20/2007										
BRIDGE REPLACEMENT(P)	0.1	$55,000	7/16/2009	$60,000	6/3/2009										
BRIDGE REPLACEMENT(P)	0.1	$85,000	1/5/2010	$75,000	6/3/2009										
TRANSP ENHANCEMENT(P)		$60,000	7/15/2013												
TRANSP ENHANCEMENT(P)		$51,000	1/4/2012												
BRIDGE REPLACEMENT(P)		$90,000	6/8/2009	$91,000	6/1/2009										
MINOR WIDENING(O)	0.45	$50,000	11/26/2002												2/15/2005
NEW ROUTE(O)		$1,200,000	8/12/2013												
WEIGH STA REHAB(P)	0.1	$140,000	9/15/2004												
WEIGH STA REHAB(P)	0.1	$180,000	3/8/2005												
LANDSLIDE REPAIR(P)							1	1		1	1		1	1	
MAJOR WIDENING(O)	3.2	$90,000	5/20/1998				0	0		0	0		0	0	
I-CHANGE RECONST(O)	0.4														
LANDSLIDE REPAIR(P)							3	3		3	3		3	3	
MAJOR WIDENING(O)	1.5	$385,500	12/14/1995				6	6		6	0		6	0	
MAJOR WIDENING(O)	1.5	$45,540	12/5/1997				0	0		0	0		0	0	
I-CHANGE RECONST(O)	3.574	$12,690	6/23/2004				6	0		6	0		6	0	
MAJOR WIDENING(O)	3.9	$1,300,000	7/11/1996				6	0		6	0		6	0	
MAJOR WIDENING(O)	2.4	$1,000,000	2/15/2000				6	6		6	6		6	4	
MAJOR WIDENING(O)	2.5	$1,200,000	10/26/2000				8	0		8	0		8	0	
NEW ROUTE(O)	0.331	$360,000	10/30/1988				6	6		6	6		6	2	5/1/1989

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SFTY TE IMPR	0.12	$30,000	11/8/1990				7	7		7	7		7	5	4/1/1991
RELOCATION(O)	0.7	$622,000	6/20/2000				7	0		7	0		7	0	
RELOCATION(O)	1.4	$1,000,000	6/20/2000				8	0		8	0		8	0	
RELOCATION(O)	1.8	$1,400,000	6/3/2004												
MAJOR WIDENING(O)	12.57	$265,000	12/8/1999				0	0		0	0		0	0	
MAJOR WIDENING(O)	9.7	$500,000	9/11/2000				0	0		0	0		0	0	
MAJOR WIDENING(O)	4.5	$500,000	2/13/2009				0	0		0	0		0	0	
SAFETY-HAZARD ELIM(P)	0.623	$474,500	2/8/2005												
MAJOR WIDENING(O)	3	$4,285,000	4/11/2006												
CONGESTION MITIGTN(O)	1	$232,111	8/17/2012												
NEW ROUTE(O)	1.25	$50,000	5/24/1999				4								
MAJOR WIDENING(O)	1.34	$70,261	12/16/2003				5	5		5	5		5	0	
BYPASS(O)	3.5	$999,992	2/8/2011				0	0		0	0		0	0	
MAJOR WIDENING(O)	1.7	$103,081	11/2/2004				5	5		5	2		5	0	
SPOT IMPROVEMENTS(O)	2.1	$530,000	1/16/2002												
SPOT IMPROVEMENTS(O)	1.7	$385,000	9/18/2002												
BRIDGE REPLACEMENT(P)	0.1	$10,000	1/30/1990				4	4		4	4		4	3	
BRIDGE REPLACEMENT(P)	0.1	$112,000	6/11/1991				4	4		4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$576,000	1/30/1993				6	6		6	5		6	1	
BRIDGE REPLACEMENT(P)	0.1	$107,000	12/1/1989				2	2		2	2		2	0	10/1/1991
BRIDGE REPLACEMENT(P)	0.1	$42,000	2/18/1989				2	2	3/23/1989	2	2		2	0	
BRIDGE REPLACEMENT(P)	0.3	$116,888	11/28/2005				7	0		7	0		7	0	
SAFETY(P)	12.6	$1,500,000	12/19/1999												
RECONSTRUCTION(O)	1.6	$1,735,000	11/8/2004												
SAFETY(P)	0.2	$100,000	12/12/2002												
RECONSTRUCTION(O)	3.8	$2,500,000	1/9/2006												

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
LANDSLIDE REPAIR(P)	1	$33,000	4/16/1987				2	2		2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$5,000	4/25/1990				2	2		2	2		2	2	8/1/1990
RELOCATION(O)	1.1	$560,000	3/18/2013												
BRIDGE REPLACEMENT(P)	0.38	$20,000	9/18/1986				1	1		1	1		1	0	11/1/1990
CONGESTION MITIGTN(O)	0.1	$54,105	1/25/2005				6	0		6	0		6	0	
CONGESTION MITIGTN(O)	0.1	$200,000	9/1/1995				7	7		7	7		7	7	
RECONSTRUCTION(O)	0.4	$345,000	9/11/1997				6	0		6	0		6	0	
SAFETY	3	$50,000	8/24/1994				5	5	10/6/1994	5	1		5	0	
NEW ROUTE(O)	0.27	$272,000	12/13/1990				6	6	11/28/1990	6	6		6	2	
SAFETY		$70,000	9/3/1993				5	5	2/15/1994	5	2		5	0	
MAJOR WIDENING(O)	2.1	$1,143,034	2/9/2004				5	0		5	0		5	0	
MAJOR WIDENING(O)	0.1	$175,000	8/6/1997				5	0		5	0		5	0	
SAFETY(P)	0.1	$5,000	5/24/1999												
SAFETY(P)		$120,000	10/11/2012												
BRIDGE REPLACEMENT(P)	0.22	$125,000	1/9/1990				4	4		4	4		4	4	
CONGESTION MITIGTN(O)		$170,000	2/20/2007												
CONGESTION MITIGTN(O)		$30,000	4/2/2007												
CONGESTION MITIGTN(O)	0.1	$20,000	9/5/2006												
CONGESTION MITIGTN(O)	0.1	$65,000	2/20/2007												
GRADE DRAIN & SURFAC	74.7	$5,265,614	5/16/1994				0	0		0	0		0	0	
GRADE DRAIN & SURFAC	1.5						6	1		6	0		6	0	
GRADE & DRAIN	3.7						6	6		6	0		6	0	
GRADE DRAIN & SURFAC	3.4						6	0		0	0		0	0	
GRADE AND DRAIN	2.3						5	0		5	0		5	0	
GRADE AND DRAIN	2.1						4	4		4	0		4	0	
MINOR WIDENING(O)	0.45						7	7		7	7		7	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJR WIDENING	1.606	$472,000	10/11/1990				8	8		8	8		8	4	
MAJOR WIDENING(O)	2.225	$1,200,000	12/7/1992				6	6	8/11/1986	6	2		6	0	
RECONSTRUCTION(O)	3.06	$95,000	10/6/1986				4	4	6/12/1985	4	4		4	2	
SAFETY(P)	0.1	$205,000	1/11/2010	$230,000	1/15/2008										
MAJR WIDENING	0.5	$319,000	4/25/1990				5	5	4/21/1989	5	1		5	1	
SAFETY	5	$140,000	11/27/1990				7	7	12/11/1990	7	7		7	5	
SPOT IMPROVEMENTS(O)	0.7	$200,000	2/19/1998				5	0		5	0		5	0	
RELOCATION(O)	2.2	$150,000	9/30/1992				5	5		5	1		5	1	
MAJOR WIDENING(O)	1.14	$465,000	11/22/1996				6	6		6	1		6	0	
MAJOR WIDENING(O)	4.5						4	4	5/27/1987	4	0		4	0	
MAJOR WIDENING(O)	7.5	$1,535,000	6/9/1997				5	0		5	0		5	0	
SAFETY		$75,000	8/25/1992				5	5		5	5		5	0	
SAFETY		$167,000	9/8/1992				5	5		5	5		5	0	
MAJOR WIDENING(O)	2.4	$3,317,582	9/27/2007				11	11		11	11		11	2	
NEW ROUTE(O)	0.7	$13,000	7/19/1994				1	1		1	0		1	0	
SFTY TE IMPR		$15,000	3/27/1991				4	0		4	0		4	0	
MINOR WIDENING(O)	0.47	$3,155,000	2/18/2009				7	7		7	7		7	0	
MAJOR WIDENING(O)	1.3	$761,000	3/25/1999				4	0		4	0		4	0	
SAFETY-HAZARD ELIM(P)	0.1	$90,000	12/2/1997				5	0		5	0		5	0	
NEW ROUTE(O)	0.6						7	7	1/26/1991	7	7		7	1	
NEW ROUTE(O)							2	2		2	2		2	0	
NEW ROUTE(O)	2	$200,000	3/20/2000												
MAJOR WIDENING(O)	2.9	$300,000	5/20/1985				7	7		7	7		7	2	9/1/1988
RECONSTRUCTION(O)	8.9	$1,500,000	12/17/1997												
MINR WIDENING	0.578	$20,000	12/23/1985				6	6		6	6		6	0	
MAJOR WIDENING(O)	0.6	$400,000	5/13/1996				6	6		6	2		6	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY		$225,000	6/23/1994				7	7	7/12/1994	7	0		7	0	
MAJOR WIDENING(O)	3.2	$1,800,000	10/31/2007				10	0		10	0		10	0	
MAJOR WIDENING(O)	3.5	$1,100,000	10/5/2000				6	0		6	0		6	0	
SAFTEY (E)		$0	7/1/1994				2	0		2	0		2	0	
MAJOR WIDENING(O)	0.75	$32,000	9/27/1995				4	4		4	3		4	0	
MAJOR WIDENING(O)	1.4	$460,000	9/26/2008				0	0		0	0		0	0	
RECONSTRUCTION(O)	0.1	$5,000	4/2/1997												
NEW ROUTE(O)	1.26	$933,042	9/16/2004				6	0		6	0		6	0	
NEW ROUTE(O)	6	$600,000	3/16/1999				0	0		0	0		0	0	
I-CHANGE RECONST(O)	3	$137,000	2/27/2002												
SAFETY		$35,000	6/6/1994				1	0		1	0		1	0	
SAFETY		$20,000	9/21/1994				0	0		0	0		0	0	
NEW INTERCHANGE(O)	1	$290,000	8/9/2004				3			3			3		
SPOT IMPROVEMENTS(O)	1	$50,000	3/19/1998				4			4			4		
RELOCATION(O)	2.46	$1,535,000	11/1/2006												
RELOCATION(O)	1.6	$805,000	11/15/2006												
NEW ROUTE(O)	1	$800,000	10/26/1998												
NEW ROUTE(O)	0.5	$250,000	6/12/2000												
BRIDGE REPLACEMENT(P)	0.1	$61,000	2/25/2002												
NEW ROUTE(O)	0.5	$500,000	6/8/2005												
RECONSTRUCTION(O)	0.5	$100,000	7/12/1996												
MAJOR WIDENING(O)	1.8	$155,632	2/8/2010												
MAJOR WIDENING(O)	1	$200,000	11/20/1998												
CONGESTION MITIGTN(O)		$10,000	2/25/2013	$165,000	10/20/2010										
MATCHED FED FUNDS(O)	0.1	$233,064	6/6/2013												
SAFETY-HAZARD ELIM(P)	1	$95,000	8/4/2008												

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY-HAZARD ELIM(P)	1.4	$120,000	6/25/2003												
SAFETY-HAZARD ELIM(P)	0.1	$35,000	9/26/2002												
BRIDGE REPLACEMENT(P)	0.4	$50,746	12/8/2004				6	6		6	6		6	2	
SAFETY(P)	0.4	$40,000	9/23/1999												
SAFETY-HAZARD ELIM(P)	0.1	$1,169	10/26/2005												
SAFETY-HAZARD ELIM(P)	0.1	$40,550	12/17/2001												
SAFETY-HAZARD ELIM(P)	0.1	$6,652	2/27/2006												
MAJOR WIDENING(O)	1.78	$374,710	1/25/2000				6	6		6	5		6	0	
BRIDGE REPLACEMENT(P)	0.1	$19,082	1/10/2005				6	6		6	1		6	1	
SAFETY-HAZARD ELIM(P)	0.1	$55,000	12/13/2005												
SAFETY-HAZARD ELIM(P)	0.2	$470,000	4/2/2012	$100,000	11/2/2007										
SAFETY-HAZARD ELIM(P)	0.1	$63,000	7/15/2003												
SAFETY-HAZARD ELIM(P)	0.1	$150,000	12/3/2003												
SAFETY-HAZARD ELIM(P)	0.2	$100,000	4/11/2006												
RELOCATION(O)	4.4	$1,100,000	6/21/1995				3	3		3	0		3	0	
RELOCATION(O)	5.7	$632,000	7/24/1997				4	4		4	2		4	2	
RELOCATION(O)	2.8	$750,000	1/24/1996				4	4		4	0		4	0	
RELOCATION(O)	2.1	$400,000	5/26/1994				4	4		4	1		4	1	
BRIDGE REPLACEMENT(P)	0.1	$120,667	3/24/2005				3	0		3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$200,000	3/8/2005												
BRIDGE REPLACEMENT(P)	0.1	$100,000	8/24/1994				3	3	10/4/1994	3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	6/25/2004												
BRIDGE REPLACEMENT(P)	0.1	$10,000	12/3/1996				2	0		2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	3/25/1997				3	0		3	0		3	0	
BRIDGE REHAB(P)	0.1						0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$205,000	9/22/2005				8	0		8	0		8	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$28,100	2/1/2010				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$60,300	7/30/2007				6	0		6	0		6	0	
BRIDGE REPLACEMENT(P)	0.1	$150,000	9/18/1998				7	0		7	0		7	0	
RECONSTRUCTION(O)	1.3	$330,000	9/18/1998												
BRIDGE REPLACEMENT(P)	0.587	$20,000	6/18/2001												
BRIDGE REPLACEMENT(P)	0.1	$100,000	5/20/2005												
BRIDGE REPLACEMENT(P)	0.1	$1,080,000	9/1/2011												
BRIDGE REPLACEMENT(P)	0.1	$435,000	10/20/2008	$300,000	11/2/2007										
BRIDGE REPLACEMENT(P)	0.1	$1,125,000	10/21/2004				4	4		4	4		4	0	
BRIDGE REPLACEMENT(P)	0.1	$30,000	2/27/2006												
BRIDGE REPLACEMENT(P)	0.1	$90,000	8/7/2008	$150,000	2/7/2008										
BRIDGE REPLACEMENT(P)	0.1	$830,000	3/20/2006				4	4		4	4		4	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	7/6/2006												
BRIDGE REPLACEMENT(P)	0.1	$75,000	6/10/2003												
BRIDGE REPLACEMENT(P)	0.1	$430,000	6/2/2008	$430,000	2/5/2008										
BRIDGE REPLACEMENT(P)	0.1	$75,000	6/1/2010												
BRIDGE REPLACEMENT(P)	0.1	$166,000	7/1/2008	$205,000	10/17/2007										
BRIDGE REPLACEMENT(P)	0.1	$40,000	7/1/2008	$75,000	11/2/2007		2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$40,000	5/5/2008	$5,000	11/2/2007		2	2		2	2		2	0	4/15/2009
CONGESTION MITIGTN(O)	0.089	$160,000	8/28/2013				3	2		3	2		3	1	
LANDSLIDE REPAIR(P)	2	$92,000	4/22/2004												
LANDSLIDE REPAIR(P)	1	$65,000	6/11/2002												
BRIDGE REPLACEMENT(P)		$455,000	1/8/2007												
NEW INTERCHANGE(O)		$2,500,000	11/8/2006												
RECONSTRUCTION(O)	1.46	$515,000	9/21/2011												
RECONSTRUCTION(O)	0.85	$1,125,000	5/31/2006												

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RECONSTRUCTION(O)	0.65	$700,000	5/11/2009	$650,000	12/16/2008										
DRAINAGE IMPROVE(P)	1	$50,000	8/31/2006												
NEW ROUTE(O)		$100,000	1/8/2007												
RECONSTRUCTION(O)		$10,000	6/15/2010	$50,000	11/2/2007										
RECONSTRUCTION(O)	2.65	$40,000	6/10/2012	$1,500,000	11/5/2007										
SAFETY(P)	0.497	$50,000	1/28/2013												
SAFETY(P)	0.04	$70,000	11/15/2011												
REST AREA REHAB(P)		$126,500	9/28/1993				3	3	5/29/1987	3	3		3	3	4/15/1988
REST AREA REHAB(P)							2	2	5/29/1987	2	2		2	2	4/15/1988
MAJOR WIDENING(O)	3.9						2	2	1/19/1990	2	0		2	0	1/30/1991
REST AREA REHAB(P)		$45,000	2/22/1995				2	2	12/13/1995	2	0		2	0	
MAJOR WIDENING(O)	4.7	$85,000	7/17/1996				2	2	###########	0	0		0	0	
MAJOR WIDENING(O)	5	$595,000	7/19/1994				5	5	3/21/1995	5	1		5	0	
MAJOR WIDENING(O)	2.6	$349,626	3/14/2006				5	5	5/14/1997	5	2		5	1	
MAJOR WIDENING(O)	4	$98,793	8/10/2005				3	3	5/8/1998	3	1		3	0	
NEW ROUTE(O)	1.42	$85,000	11/4/1998				3	3		3			3		
MAJOR WIDENING(O)	4.7	$166,000	4/1/1998				4	4	10/7/1998	4			4		
MAJOR WIDENING(O)	3	$180,000	4/1/1998				8	8	10/7/1998	8	4		8	0	
SAFETY	0.3						0	0		0	0		0	0	
RELOCATION(O)	5	$5,221,680	11/25/2009	$4,000,000	10/17/2007										
NEW INTERCHANGE(O)	0.5	$500,000	5/17/2004												
RECONSTRUCTION(O)	4	$4,500,000	3/14/2007												
MAJOR WIDENING(O)	4.6	$267	1/10/2005												
MAJOR WIDENING(O)	3.1	$200,000	4/9/2003												
MAJOR WIDENING(O)	2.6	$1,600,000	2/8/2010	$2,500,000	10/1/2009										
MAJOR WIDENING(O)	2.6	$2,400,000	2/8/2010	$1,500,000	1/25/2008										

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
NEW ROUTE(O)	2.88	$490,000	3/30/1995				6	6	2/14/1992	6	6		6	1	
MAJR WIDENING	0.7						6	6	5/5/1989	6	6		6	4	
MAJR WIDENING	0.7						4	4	4/13/1990	4	4		4	0	
MINOR WIDENING(O)	1.3	$98,630	1/10/2005				7	7	12/16/1999	7	7		7	0	
MINOR WIDENING(O)	0.4	$200,000	12/23/1997				5	5	2/26/1998	5	5		5	3	
RECONSTRUCTION(O)	0.3	$700,000	7/30/2000				7	7	10/12/2000	7	6		7	2	
NEW ROUTE(O)	4.3	$5,200,000	8/4/2012	$5,000,000	11/1/2011										
NEW ROUTE(O)	2.66	$4,170,000	5/16/2013	$2,724,000	10/26/2007										
BYPASS(O)	2.8	$1,900,000	10/25/2010	$1,900,000	10/26/2007										
BRIDGE REPLACEMENT(P)	0.1	$15,000	12/20/2004												
MAJOR WIDENING(O)	2.4	$5,200,000	4/15/2013	$9,000,000	1/1/2013										
RECONSTRUCTION(O)		$475,000	10/16/2007	$475,000	10/17/2007										
MAJOR WIDENING(O)	2.7	$2,505,124	8/12/2011												
BRIDGE REPLACEMENT(P)		$0	7/1/1994				0	0		0	0		0	0	
MAJOR WIDENING(O)	0.3	$300,000	12/4/2003				5	5		5	5		5	4	
I-CHANGE RECONST(O)	0.8	$355,000	9/13/1993				6	6	3/18/1994	6	6		6	1	
MAJOR WIDENING(O)	3.4	$2,780,975	6/5/2013	$0	10/17/2007		9	9	4/8/1998	9	8		9	4	
MAJOR WIDENING(O)	3.4	$3,600,000	12/12/1997												
MAJOR WIDENING(O)	1.5	$200,000	12/7/1992				5	5	4/2/1993	5	4		5	0	
MAJOR WIDENING(O)	1	$456,000	3/2/1993				5	5	1/29/1993	5	5		5	4	
BRIDGE REPLACEMENT(P)	0.15	$32,000	4/25/1990				4	4	6/28/1990	4	4		4	1	5/15/1992
BRIDGE REPLACEMENT(P)	0.198	$40,000	2/16/1990				2	2	4/17/1990	2	2		2	1	6/1/1992
BRIDGE REPLACEMENT(P)	0.217	$35,000	7/1/1992				4	4		4	4		4	3	
BRIDGE REPLACEMENT(P)	0.1	$22,000	4/29/1991				2	2	5/24/1990	2	2		2	2	
NEW ROUTE(O)	3.08	$869,000	2/27/1995				6	6	12/10/1992	6	5		6	1	
NEW ROUTE(O)	1.1	$1,000,000	9/8/1992				7	7	11/17/1992	7	6		7	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$7,000	8/7/1989				2	2	10/12/1989	2	2		2	2	12/1/1990
MAJOR WIDENING(O)	0.6	$350,000	8/29/1995				6	0		6	0		6	0	
MAJOR WIDENING(O)	1.4	$840,000	12/21/2010	$800,000	10/26/2007										
BRIDGE REPLACEMENT(P)	0.1	$40,000	10/22/1991				6	6	1/17/1992	6	6		6	6	
BRIDGE REPLACEMENT(P)	0.1	$33,000	3/22/1993				2	2	11/21/1991	2	2		2	0	
BRIDGE REPLACEMENT(P)	0.1	$45,000	3/25/1992				3	3	2/7/1991	3	3		3	2	4/10/1992
BRIDGE REPLACEMENT(P)	0.1	$25,000	12/1/1989				2	2	2/8/1990	2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$2,000	8/22/1991				1	1	1/17/1992	1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$40,000	8/21/1992				3	3	12/29/1992	3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$40,000	8/21/1992				3	3	12/29/1992	3	3		3	2	
MINR WIDENING	0.691						4	4	5/3/1990	4	4		4	1	4/1/1991
MAJR WIDENING	1.268						2	2	5/24/1989	2	2		2	0	2/15/1991
BRIDGE REPLACEMENT(P)	0.1	$50,000	9/13/1993				3	3	10/27/1993	3	3		3	3	
SAFETY	0.379	$330,000	7/7/1995				3	3	6/18/1992	3	3		3	0	
BRIDGE REPLACEMENT(P)	0.1	$400,000	11/22/1996				5	5	2/12/1997	5	2		5	1	
CONGESTION MITIGTN(O)	0.48	$500,000	6/29/1994				3	3	6/5/1992	3	3		3	1	
SAFETY		$25,000	9/12/1990				5	5	11/12/1990	5	5		5	5	
RELOCATION(O)	3.1	$376,000	11/22/1996				5	5	4/7/1997	5	0		5	0	
MAJOR WIDENING(O)	0.749	$1,000,000	12/12/1995				0	0	10/3/1995	0	0		0	0	
MAJOR WIDENING(O)	0.749	$550,000	12/12/1995												
MAJOR WIDENING(O)	2.6	$1,000,000	12/12/1995				4	4	10/3/1995	4	4		4	1	
MAJOR WIDENING(O)	3.9	$2,550,000	1/14/1999				6	6	2/18/1999	6	4		6	0	
MAJOR WIDENING(O)	4.8	$1,530,000	9/2/2005				6	0		6	2		6	0	
BRIDGE REPLACEMENT(P)	0.737	$78,000	4/25/1990				4	4	8/10/1989	4	4		4	2	
BRIDGE REPLACEMENT(P)	0.1	$5,000	5/24/1990				1	1	7/19/1990	1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$200,000	7/19/1990				4	4	8/30/1989	4	4		3	4	2/18/1991

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MINR WIDENING	0.44	$23,000	6/26/1989				2	2	8/15/1989	2	2		2	0	1/18/1991
RELOCATION(O)	4.5	$775,000	5/6/1993				3	3	4/30/1992	3	3		3	1	9/1/1994
MAJR WIDENING	1.8	$1,897,894	8/6/2004				5	5	9/18/1990	5	5		5	5	
MAJOR WIDENING(O)	1.52	$540,000	3/5/1993				6	6	9/17/1991	6	5		6	1	
MAJR WIDENING	1.6	$325,000	4/3/1995				3	3	6/11/1991	3	3		3	0	
MAJR WIDENING	3	$925,000	6/29/1990				5	5	4/12/1990	5	5		5	5	
MAJR WIDENING	3.8						6	6	5/2/1990	6	6		6	0	
BRIDGE REPLACEMENT(P)	0.36	$43,000	6/26/1989				4	4	3/18/1988	4	4		4	3	2/1/1989
NEW ROUTE(O)	1.95	$2,090,000	6/8/2005												
MAJR WIDENING	1.07	$119,000	1/22/1992				3	3	9/14/1989	3	0		3	0	
NEW ROUTE(O)	1.9	$265,000	12/7/1992				6	6	1/26/1993	6	5		6	0	
NEW ROUTE(O)	2.6	$570,000	5/8/1995				5	5	9/21/1993	5	2		5	0	
NEW ROUTE(O)	1.05	$175,000	8/6/1993				4	4	9/21/1993	4	2		4	0	
RECONSTRUCTION(O)	4.5	$6,530,000	11/22/2011	$6,270,000	10/26/2007										
SAFETY-HAZARD ELIM(P)	0.3	$70,000	###########				4	4	2/14/1996	4	1		4	0	
NEW ROUTE(O)	0.8	$400,000	7/24/1997				4	4	8/20/1997	4	1		4	0	
NEW ROUTE(O)	1.8	$1,670,000	3/17/1999				2	2	1/13/2000	2			2		
NEW ROUTE(O)	1.8	$2,100,000	10/20/2010	$2,100,000	10/29/2007										
MAJOR WIDENING(O)	2.3	$1,000,000	9/28/2001				6	6		6	6		6		
RECONSTRUCTION(O)	2.2	$3,482,000	7/6/2009				5	5		5	4		5	1	
SAFETY(P)		$21,244	2/24/2000												
MINOR WIDENING(O)	0.89	$15,693	8/15/2012												
BIKE/PED FACIL(O)	1	$115,000	3/13/2009												
GRADE DRAIN & SURFAC	6.5	$475,000	7/8/1993				5	0		5	0		5	0	
MAJOR WIDENING(O)	1.5	$4,800,000	3/19/2007				9	9							
MINOR WIDENING(O)	1.8	$770,000	7/21/2008	$330,000	10/29/2007										

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	1	$1,954,000	10/23/2013	$1,400,000	10/29/2007										
NEW ROUTE(O)		$1,980,000	9/17/2012	$1,900,000	10/28/2009										
BIKE/PED FACIL(O)	1.9	$58,500	8/18/2003												
BIKE/PED FACIL(O)	1.5	$12,000	2/7/2006												
BRIDGE REPLACEMENT(P)	0.1	$16,158	4/1/2005												
MAJOR WIDENING(O)	1.9	$300,000	6/6/1994				8	8	2/2/1995	8	8		8	8	
BIKE/PED FACIL(O)		$115,000	9/20/2012												
MAJOR WIDENING(O)	0.9	$253,456	6/23/2004				5	5	5/5/1993	5	5		5	2	
MAJOR WIDENING(O)	0.8	$360,000	9/9/2009												
MAJOR WIDENING(O)	0.56	$1,500,000	10/27/2007												
MAJOR WIDENING(O)	1.345	$650,000	9/23/1998				6	6	2/1/1995	6	3		6	1	
RECONSTRUCTION(O)	2.1	$1,000,000	11/15/2006												
MAJR WIDENING	0.379	$87,000	4/13/1992				3	3	2/6/1991	3	2		3	0	
I-CHANGE RECONST(O)	0.616	$1,950,000	12/18/2013	$2,000,000	1/1/2013										
NEW ROUTE(O)	1.6	$330,000	12/2/1991				4	4	3/7/1991	4	4		4	4	
NEW ROUTE(O)	0.79	$21,086	2/15/2012												
MAJOR WIDENING(O)	1.941	$2,700,000	4/24/1998				6	6	11/10/1998	6	0		6	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	2/1/1991				5	5	3/7/1991	5	4		5	0	
MAJOR WIDENING(O)	3.2	$950,000	10/1/2007				6	6		6	0		6	0	
MINOR WIDENING(O)	0.5	$161,000	3/9/1993				2	2	9/21/1993	2	2		2	1	
MINR WIDENING	0.5	$138,484	7/1/1994				5	5	9/13/1990	5	5		5	0	7/12/1991
MAJOR WIDENING(O)	5.5	$3,360,000	10/29/1997				11	11	12/9/1997	11	9		11	7	
MAJOR WIDENING(O)	2	$328,151	11/8/2004				5	5	1/19/2000	5	5		5	5	10/31/2002
I-CHANGE RECONST(O)	0.2	$1,000,000	1/24/2002				4	4	11/15/2001	4	0		4	0	
SAFETY-RR SEPARATN(P)	0.6	$816,212	3/29/2005				5	5	###########	5	5		5	1	
SAFETY	0.33	$95,000	9/12/1994				6	6	2/2/1995	6	0		6	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	3.5	$1,356,600	7/14/2004				6	6	10/17/2000	6	6		6	1	
MAJOR WIDENING(O)	6.14	$4,000,000	6/11/2007												
MAJOR WIDENING(O)	1.6	$1,380,000	7/1/1994				6	6	6/27/1994	6	6		6	5	
I-CHANGE RECONST(O)	2.1	$95,000	1/11/2008				6	6		6	6		6		
MAJOR WIDENING(O)	5	$9,000,000	5/8/2012				7			7			7		
RECONSTRUCTION(O)	6	$4,100,000	11/25/2009				8			8			8		
RECONSTRUCTION(O)	0.3	$435,651	8/10/2005				5	5	10/27/1994	5	4		5	0	
MAJOR WIDENING(O)	2.6	$1,540,240	1/16/2008				8	8	4/7/1999	8	8		8	8	
CONGESTION MITIGTN(O)		$5,000	10/6/1994				0	0		0	0		0	0	
MAJOR WIDENING(O)	1.3	$497,254	11/25/2009				7	7	1/25/2000	7	7		7	2	
MINOR WIDENING(O)	0.2						3	3	11/4/1993	3	3		3	0	
SAFETY							0	0		0	0		0	0	
BYPASS(O)	2.4	$2,635,000	6/26/2000				12	12	10/19/2000	12	7		12	1	
MAJOR WIDENING(O)	3.5	$116,000	4/12/2005				2	2	4/22/1997	2	2		2	2	
MAJOR WIDENING(O)	2.9	$54,501	4/12/2005				6	6	4/22/1997	6	6		5	5	
MINOR WIDENING(O)	0.7	$215,000	6/22/1995				4	4	11/11/1995	4	3		4	2	
MINOR WIDENING(O)	0.7	$335,000	4/23/1997				4	4	5/6/1997	4	4		4	0	
SAFETY	0.53	$55,000	7/1/1994				3	3	7/25/1994	3	2		3	0	
SAFETY-HAZARD ELIM(P)	0.2	$50,000	1/13/1997				6	6	2/18/1997	6	5		6	2	
SAFETY(P)	0.5	$980,000	6/14/2012	$500,000	2/7/2008										
MAJOR WIDENING(O)	0.9	$28,219	2/1/2005				6	6	12/8/1999	6	0		6	0	
NEW ROUTE(O)	2.1	$817,000	9/8/1998				6	6	3/30/2000	6	5		6	5	
NEW ROUTE(O)		$635,000	5/14/1998				6	6	6/24/1998	6	0		6	0	
NEW ROUTE(O)	0.596	$200,000	9/23/1998				5	5	8/28/1997	5	3		5	1	
BRIDGE REPLACEMENT(P)	0.1	$26,443	9/27/2009												
CONTINGNCY ACCOUNT(O)		$450,000	8/20/2012												

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
CULVERT REPLACMENT(P)		$100,000	8/31/2011												
SAFETY(P)	0.1	$58,400	7/19/2004												
RECONSTRUCTION(O)	1.5	$1,145,000	9/18/2012												
NEW ROUTE(O)		$110,000	7/27/2012												
NEW ROUTE(O)		$6,040,000	8/31/2010												
BRIDGE REPLACEMENT(P)	0.1	$5,000	8/11/1988				1	1	9/21/1988	1	1		1	0	
BRIDGE REPLACEMENT(P)	0.11	$30,000	8/17/1989				3	3	10/11/1989	3	3		3	2	
SAFETY-HAZARD ELIM(P)	0.3	$65,000	11/12/1997				3	3		3	2		3	0	
SAFETY-HAZARD ELIM(P)	0.4	$100,000	2/27/1998				3	3	4/2/1998	3	3		3	0	
SAFETY-HAZARD ELIM(P)	0.422	$490,242	6/13/2001				5	5	1/26/1999	5	5		5	0	
SAFETY-HAZARD ELIM(P)	0.1	$605,000	3/20/1998				4	4	4/15/1998	4	4		4	2	
SAFETY(P)	0.2	$350,000	2/11/2002				3	3	2/19/2002	3			3		
SAFETY-HAZARD ELIM(P)	0.2	$310,000	4/6/2009				8			8			8		
SAFETY-HAZARD ELIM(P)	0.439	$600,000	1/4/2010				5			5			5		
MAJOR WIDENING(O)	2.4	$800,000	8/21/1992				6	6	10/28/1990	6	4		6	0	
MAJOR WIDENING(O)	4.7	$232,549	6/23/2004				5	5	2/3/1993	5	4		5	0	
BRIDGE REPLACEMENT(P)	0.1	$868	12/8/2004				2	2	10/26/1994	2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$20,000	1/30/1993				1	0		1	0		1	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	3/15/1994				4	4	5/17/1994	4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$2,112	12/8/2004				2	2	1/11/1995	2	2	##########	2	2	
BRIDGE REPLACEMENT(P)	0.1	$65,000	11/22/1993				3	3	2/3/1994	3	3		3	2	
BRIDGE REPLACEMENT(P)	0.1	$40,000	3/9/1993				1	1	5/5/1993	1	1		1	0	
BRIDGE REPLACEMENT(P)	0.1	$37,000	9/8/1992				2	2	12/30/1992	2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$80,000	4/26/1994				2	2	9/21/1994	2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/11/1992				2	2	2/11/1993	2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$35,000	8/24/1993				2	2	10/28/1993	2	2		2	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$35,000	8/2/1994				2	2	###########	2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$35,000	11/24/1997				1	1	12/16/1997	1	1		1	0	
BRIDGE REPLACEMENT(P)	0.1	$80,000	9/1/1995				4	4	###########	4	4		4	1	
BRIDGE REPLACEMENT(P)	0.1	$40,000	9/1/1995				3	3	###########	3	3		3	2	
BRIDGE REPLACEMENT(P)	0.1	$105,000	9/19/1994				4	4	12/13/1995	4	4		4	3	
BRIDGE REPLACEMENT(P)	0.1	$52,935	3/11/2004				4	4	7/30/1996	4	4		4	1	
BRIDGE REPLACEMENT(P)	0.1						0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.262	$143,151	11/2/2004				5	5	2/11/1997	5	5		5	1	
BRIDGE REPLACEMENT(P)	0.1	$125,375	10/26/2004				2	2	11/6/1997	2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$80,000	3/12/1996				4	4	###########	4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$130,000	5/22/1996				2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$99,467	8/9/2005				7	7	2/11/1997	7	7		7	2	
BRIDGE REPLACEMENT(P)	0.1	$50,000	9/19/1994				4	4	###########	4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$45,325	1/10/2005				5	5	6/25/1997	5	5		5	0	
BRIDGE REPLACEMENT(P)	0.1	$30,000	7/26/1996				2	2	9/10/1996	2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$5,157	2/27/2004				2	2	1/13/2000	2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	10/28/1994				2	2	###########	2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$57,000	8/18/1993				3	3	10/28/1993	3	3		3	0	
BRIDGE REPLACEMENT(P)	0.1	$70,000	9/19/1994				3	3	###########	3	3		3	0	
BRIDGE REPLACEMENT(P)	0.124	$30,000	4/3/1998				1	1	6/24/1998	1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$52,011	6/14/2004				3	3	2/27/1997	3	3		3	1	
BRIDGE REPLACEMENT(P)	0.1	$65,000	8/19/1997				1	1	9/30/1997	1	0		1	0	
BRIDGE REPLACEMENT(P)	0.1	$13,261	3/14/2006				2	2	12/16/1997	2	1		2	0	
BRIDGE REPLACEMENT(P)	0.1	$55,000	1/31/1995				3	0		3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$460,000	4/3/1998				6	6	6/24/1998	6	4		6	1	
BRIDGE REPLACEMENT(P)	0.129	$115,000	11/12/1997				5	5	12/16/1997	5	1		5	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$20,001	2/1/2005				6	6	1/6/2000	6	2		6	1	
BRIDGE REPLACEMENT(P)	0.1	$8,397	10/7/2004				6	6	11/6/1998	6	4		6	1	
BRIDGE REPLACEMENT(P)	0.1	$80,000	10/21/1997				4	4	4/22/1997	4	3		4	0	
BRIDGE REPLACEMENT(P)	0.156	$75,000	3/26/1999				4	4	5/27/1999	4	4		4	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	7/24/2001				4	4	1/9/2002	4	1		4	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	4/26/2001				1	1		1	1		1	0	
BRIDGE REPLACEMENT(P)	0.178	$105,000	9/15/1997				5	5	10/22/1997	5	5		5	2	
BRIDGE REPLACEMENT(P)	0.1	$157,852	4/5/2005				4	4	1/12/2000	4	1		4	0	
BRIDGE REPLACEMENT(P)	0.1	$100,000	3/31/2000				3	3		3	2		3	2	
BRIDGE REPLACEMENT(P)	0.1	$15,480	6/23/2004				2	2	10/14/1997	2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$50,000	5/14/1997				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$335,000	10/2/2002				2	2		2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$170,000	2/27/2002				3	3	8/1/2002	3	3		3		
BRIDGE REPLACEMENT(P)	0.1	$5,000	7/13/2000				1	1	6/28/2000	1	1	3/6/2001	1	1	
BRIDGE REPLACEMENT(P)	0.1	$150,000	12/20/2002				2	2		2			2		
BRIDGE REPLACEMENT(P)	0.1	$475,000	8/5/2003				4	4		4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$25,000	8/18/2003				3	3		3	1		3		
BRIDGE REPLACEMENT(P)	0.1	$15,000	10/25/2004				3	3		3	1		3	1	
BRIDGE REPLACEMENT(P)	0.1	$20,000	10/2/2002				3	3		3	2		3		
BRIDGE REPLACEMENT(P)	0.1	$50,000	9/22/2005				5			5			5		
BRIDGE REPLACEMENT(P)	0.1	$75,000	5/16/2005				5			5			5		
BRIDGE REPLACEMENT(P)	0.1	$125,000	6/14/2004				6	6		6			6		
BRIDGE REPLACEMENT(P)	0.1	$295,000	1/25/2006												
BRIDGE REPLACEMENT(P)	0.1	$150,000	6/15/2004				6	6		6	1		6	1	
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/5/2004												
BRIDGE REPLACEMENT(P)	0.1	$300,000	4/4/2006				2			2			2		

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$25,000	10/18/2005												
BRIDGE REPLACEMENT(P)	0.1	$100,000	12/20/2005				5			5			5		
BRIDGE REPLACEMENT(P)	0.1	$100,000	3/5/2007												
BRIDGE REPLACEMENT(P)	0.1	$100,000	2/15/2008	$100,000	10/29/2007										
BRIDGE REPLACEMENT(P)	0.1	$150,000	6/29/2007				4			4			4		
BRIDGE REPLACEMENT(P)	0.1	$45,000	10/25/2006				3			3			3		
BRIDGE REPLACEMENT(P)	0.1	$100,000	11/8/2011												
BIKE/PED FACIL(O)		$56,000	3/4/2010												
BIKE/PED FACIL(O)		$91,246	8/17/2012												
ROCKFALL MITIGTN(P)	0.48	$16,066	11/25/2009												
SAFETY(P)	0.2	$26,638	4/1/2005												
BRIDGE REHAB(P)	0.1	$100,000	7/30/2002												
SAFETY(P)	0.9	$1,700,000	2/8/2011	$1,565,000	11/3/2009										
NEW INTERCHANGE(O)	0.1	$1,000,000	11/13/2012	$450,000	10/28/2009										
MAJOR WIDENING(O)	2	$750,000	3/30/2011	$500,000	10/29/2007										
NEW ROUTE(O)		$300,000	11/1/2006				3			3			3		
MAJOR WIDENING(O)		$3,400,000	6/26/2012	$800,000	10/29/2007										
RECONSTRUCTION(O)	4.2	$289,329	3/14/2012	$0	10/17/2007										
RECONSTRUCTION(O)	0.82	$150,000	1/23/2007												
SPOT IMPROVEMENTS(O)	4.3	$300,000	6/26/2012												
SAFETY-HAZARD ELIM(P)		$5,000	10/31/2013												
RECONSTRUCTION(O)	1.593	$100,000	2/23/2012												
NEW ROUTE(O)		$250,000	3/28/2011												
RECONSTRUCTION(O)	0.1	$35,000	4/28/2013												
RELOCATION(O)	1.3	$817,196	11/5/2004				5	5		5	0		5	0	
BYPASS(O)	3	$6,200,000	8/3/2005				7	7	7/1/2002	7	7	8/4/2003	7	2	7/23/2003

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	4.5	$6,325,000	7/17/2007				10	10	9/26/2002	10	10	4/22/2004	10	0	
MAJOR WIDENING(O)	4.3	$2,900,000	9/10/2002				9	9	12/20/2002	9	7	4/20/2006	9	0	
MAJOR WIDENING(O)	4	$3,500,000	9/10/2002				8	8	4/9/2003	8	8	4/20/2006	8	7	4/3/2007
NEW ROUTE(O)	2.65	$635,000	2/23/2005				6	6	4/20/2005	6	0		6	0	
NEW ROUTE(O)	1.14	$1,350,000	7/19/2004				9	9	2/17/2003	7	4	4/15/2004	7	0	
NEW ROUTE(O)	4.55	$3,065,713	12/12/2012				0	0		0	0		0	0	
SAFETY(P)	18.3	$500,000	8/29/2002				5	5	10/1/2002	5	5	2/19/2004	5	2	
SAFETY(P)	1.8	$2,185,000	9/13/2013												
RELOCATION(O)	11.31	$4,585,000	3/2/1993				0	0		0	0		0	0	
NEW ROUTE(O)	3.5	$1,448,578	11/18/1994				9	9	9/28/1990	9	9		9	9	
NEW ROUTE(O)	3.5	$1,471,526	12/12/1994				9	9	9/18/1992	9	6		9	0	
RECONSTRUCTION(O)	2	$1,020,000	6/16/2006				6	6	5/11/2005	6	5	1/5/2006	6	0	
RECONSTRUCTION(O)	7	$790,000	10/10/1992				7	7	5/10/1990	7	7		7	3	
RECONSTRUCTION(O)	3.51						4	4	3/15/1990	4	4		4	0	
SAFETY(P)	0.6	$100,000	8/21/2006				3	0		3	0		3	0	
RECONSTRUCTION(O)	1	$575,000	10/30/2007												
BRIDGE REPLACEMENT(P)	0.1	$55,000	5/15/1989				6	6	6/19/1989	6	6		6	2	6/1/1990
SPOT IMPROVEMENTS(O)	14	$2,999,194	4/28/2013	$2,800,000	10/17/2007		0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.9	$975,000	12/3/1996				7	7		0	0		0	0	
RECONSTRUCTION(O)		$85,000	1/22/2010	$85,000	10/29/2009										
RECONSTRUCTION(O)	2.4	$340,000	11/5/2007				6	6	9/16/2005	6	0		6	0	
MAJOR WIDENING(O)	0.8	$731,936	6/23/2004				6	6		6	2		6	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	3/27/1992				4	4	9/4/1992	4	4		4	2	
RECONSTRUCTION(O)	1	$410,700	8/28/2006				5	5	5/8/2003	5	5	7/2/2004	5	1	
MAJOR WIDENING(O)	3.7	$440,000	8/12/1994				6	6	7/12/1994	6	1		6	0	
MAJOR WIDENING(O)	3.2	$388,000	5/14/1996				4	4		5	1		4	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
MAJOR WIDENING(O)	3	$510,000	5/14/1996				4	4		5	2		4	0	
RELOCATION(O)	2.6	$1,530,000	5/11/2009	$1,530,000	1/17/2008		0	0		0	0		0	0	
RELOCATION(O)	5.5	$1,920,000	3/15/2011	$2,250,000	11/14/2007		0	0		0	0		0	0	
BYPASS(O)	5.3	$1,500,000	12/1/2004				10	10	1/11/2005	10	3	4/20/2006	10	0	
SAFETY-HAZARD ELIM(P)	1.9	$405,000	2/20/1997				5	5		5	4		5	0	
MAJOR WIDENING(O)	1.5	$144,016	2/1/2005				7	7		7	5		7	1	
RECONSTRUCTION(O)	6.35	$1,200,000	8/29/2002				4	4	9/16/2002	4	2	3/22/2004	4	0	
RECONSTRUCTION(O)	2.1	$1,905,000	11/10/2005				6	6	9/16/2002	5	2	3/22/2004	5		
RECONSTRUCTION(O)	7.15	$2,200,000	11/10/2005				11	11	7/20/2005	11	11		11	11	
RECONSTRUCTION(O)	6	$1,800,000	11/10/2005				0	0		0	0		0	0	
RELOCATION(O)	3.53	$2,500,000	11/1/2005				5	5		5	4		5	0	
RECONSTRUCTION(O)	0.1	$345,000	12/12/2005				5	5	4/23/2002	5	5	2/14/2002	5	5	9/1/2003
GRADE DRAIN & SURFAC	16.47	$821,664	2/9/1995				0	0		0	0		0	0	
GRADE DRAIN & SURFAC	4.8						0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.32	$30,000	10/19/1992				6	6	5/5/1992	6	5		6	2	
RELOCATION(O)	2.29						5	5		5	0		5	0	
RELOCATION(O)	3.7	$150,000	8/25/1992				2	2	10/14/1992	2	0		2	0	
RELOCATION(O)	2.5	$1,535,000	6/29/1994				6	5		6	1		6	0	
SPOT IMPROVEMENTS(O)	1.2	$225,000	6/24/2003				6	6	6/27/2003	6	4	11/2/2004	6	0	
NEW ROUTE(O)	0.8	$154,500	12/20/1990				4	4	1/17/1991	4	0		4	0	
MAJR WIDENING	1.2	$127,000	7/12/1991				4	4	5/17/1990	4	4		4	0	
MAJR WIDENING	2	$293,118	6/7/1994				5	5	4/25/1990	5	5		5	0	
BRIDGE REPLACEMENT(P)	0.8	$785,000	9/6/1996				7	7		0	0		0	0	
NEW ROUTE(O)	2.65	$2,725,000	9/12/2006				9	9	10/12/2004	9	5	2/28/2006	9	0	
NEW ROUTE(O)	2.46	$301,467	2/25/2013				7	7	6/15/2005	7	0		7	0	
BYPASS(O)	4.3	$1,200,000	12/2/2005				0	0		0	0		0	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RELOCATION(O)	4.1	$3,000,000	4/27/2010	$3,000,000	12/20/2007		0	0		0	0		0	0	
RELOCATION(O)	4.36	$1,050,000	6/20/2006				0	0		0	0		0	0	
RELOCATION(O)	4.1	$755,000	12/5/2007	$755,000	10/17/2007		0	0		0	0		0	0	
MAJOR WIDENING(O)	1.7	$500,000	9/16/2004				7	7	9/1/1999	7	7	9/21/2001	7	3	
SAFETY	0.04	$10,000	1/27/1992				6	6	2/4/1992	6	6		6	5	
NEW ROUTE(O)	1.2	$500,000	7/27/1998				8	8		8	6		8	2	
MAJOR WIDENING(O)	1.5	$750,000	6/27/1995				7	7	11/2/1995	0	0		0	0	
MAJOR WIDENING(O)	1.5	$1,865,000	12/12/1994				7	7	1/10/1995	7	0		7	0	
MAJOR WIDENING(O)	2.5	$781,000	6/27/1995				7	7	11/2/1995	0	0		0	0	
RECONSTRUCTION(O)	3.4	$4,630,000	8/9/2007				8	8	7/6/2005	8	1	1/5/2005	8	0	
NEW INTERCHANGE(O)	0.5	$2,160,000	9/16/2005				7	7	5/10/2005	7	5	4/21/2006	7	0	
SAFETY(P)	1	$780,000	5/10/2012	$350,000	12/20/2007										
SAFETY(P)	1.1	$1,000,000	9/2/2003				7	7	2/13/2003	7	1	9/1/2003	7	0	
SAFETY-HAZARD ELIM(P)	0.3	$40,800	2/19/2004				3	3		3	0		3	0	
SAFETY-HAZARD ELIM(P)	0.5	$3,000	8/13/2001				0	0		0	0		0	0	
SAFETY-HAZARD ELIM(P)	0.45	$300,000	5/4/2011	$150,000	10/29/2009										
SAFETY-HAZARD ELIM(P)	0.15	$20,000	4/28/2011												
SAFETY-HAZARD ELIM(P)	0.65	$40,000	1/30/2012												
SAFETY-HAZARD ELIM(P)	0.29	$125,000	7/1/2005				4	4	6/12/2003	4	2	11/1/2004	4	0	
SAFETY-HAZARD ELIM(P)	0.456	$155,000	7/5/2005				5	5	6/24/2003	5	2	12/21/2004	5	0	
SAFETY-HAZARD ELIM(P)	0.4	$130,000	3/30/2004				5	5	6/11/2003	5	1	2/24/2006	5	0	
BRIDGE REPLACEMENT(P)	0.1	$88,851	8/9/2005				5	5	9/26/1994	5	1	12/19/1995	5	1	
BRIDGE REPLACEMENT(P)	0.1	$250,000	2/25/1998				5	5		5	3		5	0	
BRIDGE REPLACEMENT(P)	0.1	$135,000	2/2/2001				5	5		5	0		5	0	
BRIDGE REPLACEMENT(P)	0.1	$85,000	8/24/1994				2	2	9/26/1994	2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$25,000	8/24/1994				2	2	9/16/1994	2	1	1/1/1995	2	1	2/28/1995

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	1.3	$425,000	4/14/2003				6	6	10/5/1999	6	6	5/21/2001	6	4	
BRIDGE REPLACEMENT(P)	0.1	$35,842	10/18/2005				3	2	3/19/2002	3	2	8/22/2002	3	3	9/5/2002
BRIDGE REPLACEMENT(P)	0.1	$100,000	4/19/1999				4	0		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$100,000	6/20/2003				4	4	7/12/2003	4	4	3/31/2004	4	3	5/31/2004
BRIDGE REPLACEMENT(P)	0.1	$35,000	6/18/2004				3	3	7/6/2004	0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$55,000	5/23/2005				3	3	6/15/2005	3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$111,615	9/23/2008				4	4	9/21/2004	4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$100,000	11/2/2009	$100,000	11/14/2007		0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$85,000	6/6/2003				4	4	6/30/2003	4	3	11/6/2003	4	0	
BRIDGE REPLACEMENT(P)	0.1	$260,000	9/9/2004				4	4	9/28/2004	4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$25,000	3/1/2006				1	1	12/7/2005	1	1	3/6/2006	1	0	
BRIDGE REPLACEMENT(P)	0.1	$125,000	6/15/2004				5	5	4/6/2005	5	5	4/20/2006	5	5	4/20/2006
BRIDGE REPLACEMENT(P)	0.1	$100,000	9/9/2004				5	5	9/21/2004	5	2	12/21/2004	5	0	
BRIDGE REPLACEMENT(P)	0.1	$55,000	10/20/2006				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$100,000	7/18/2005				3	3	8/5/2005	3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$450,000	11/30/2005				5	5	12/7/2005	5	2	4/20/2006	5	0	
BRIDGE REPLACEMENT(P)	0.1	$125,000	11/30/2006				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	1/22/2007												
BRIDGE REPLACEMENT(P)	0.1	$85,000	3/12/2010	$60,000	11/25/2008		3	0		3	0		3	0	
MINOR WIDENING(O)	0.1	$320,000	2/16/2011	$350,000	10/29/2009										
SAFETY-HAZARD ELIM(P)		$330,000	7/25/2012	$330,000	12/8/2011										
MAJR WIDENING		$225,000	10/11/1990				4	4	1/18/1991	4	4		4	4	
MAJOR WIDENING(O)	2.7	$2,100,000	10/18/1991				6	6		6	6		6	3	8/15/1994
I-CHANGE RECONST(O)	0.4	$1,690,000	4/4/2007				8	8		8	3		8	0	
BRIDGE REPLACEMENT(P)	0.1	$125,000	9/26/1989				2	2		2	2		2	2	4/1/1991
BRIDGE REPLACEMENT(P)	0.335	$85,000	8/19/1997				3	3		3	3		3	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$5,000	8/24/1990				2	2	9/21/1990	2	2		2	2	3/1/1991
RECONSTRUCTION(O)	0.3	$50,000	12/19/1997				3	3							
MAJOR WIDENING(O)	5.8	$1,102,952	8/9/2005				5	5		5	5		5	4	
BRIDGE REPLACEMENT(P)	0.25	$50,000	9/1/1994				1	1		1	1		1	0	
RELOCATION(O)	1.57	$100,766	2/2/2005				4	4		4	4		4	2	
BRIDGE REPLACEMENT(P)	0.1	$55,000	9/25/1989				2	2		2	2		2	1	8/1/1991
MAJOR WIDENING(O)	5.2	$2,410,000	11/3/1998				11	11		11	11		11	11	
MAJOR WIDENING(O)	4	$744,000	7/27/1998				4	4		4	4		4	4	
MAJOR WIDENING(O)	2.8	$541,000	7/27/1998				6	6		6	1		6	1	
RELOCATION(O)	3.8	$7,310,000	1/10/2003				8	8		8	3		8	1	
RECONSTRUCTION(O)	2.7	$277,213	12/20/2004				5	5		5	4		5	3	
RECONSTRUCTION(O)	5.2	$3,090,000	9/9/2013	$2,800,000	2/26/2010		4	2		4	2		4	0	
GRADE DRAIN & SURFAC							0	0		0	0		0	0	
MAJOR WIDENING(O)	0.5	$310,000	8/17/1999				5	5		5	2		5	1	
MAJOR WIDENING(O)	2.56	$210,000	1/28/1992				3	3		3	3		3	1	10/15/1993
MAJOR WIDENING(O)	1.9	$40,000	10/22/1991				2	2		2	2		2	2	11/1/1992
MAJOR WIDENING(O)	0.2	$330,000	5/15/1998				6	6		6	2		6	1	
ROCKFALL MITIGTN(P)	0.5						0	0		0	0		0	0	
CONGESTION MITIGTN(O)	0.5	$320,000	10/30/1997				5	5		5	4		5	1	
MAJOR WIDENING(O)	1.6	$1,965,000	9/2/2004				5	5		5	5		5	5	
NEW ROUTE(O)	0.9	$300,000	10/2/2000				4	4		4	4		4	1	
RECONSTRUCTION(O)	0.2	$15,000	8/17/1999				1	1		1	1		1	0	
NEW ROUTE(O)	0.2	$50,000	8/26/2001				5	0							
BRIDGE REPLACEMENT(P)	0.1	$31,000	9/25/1989				3	3		3	3		3	0	10/1/1991
MAJOR WIDENING(O)	0.355	$25,000	6/7/1999				1	1		1	0		1	0	
RECONSTRUCTION(O)	2.7	$1,840,000	4/23/2009				7	7		7	4		7	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RECONSTRUCTION(O)	1.5	$2,670,000	2/3/2012				5	5		5	4		5	2	
MINOR WIDENING(O)	1	$215,000	11/17/1997				6	6		6	6		6	6	
MAJOR WIDENING(O)	2.8	$4,350,000	6/18/1993				11	11	5/11/1992	11	11		11	5	
SAFETY	0.4	$60,000	9/12/1994				3	3	10/3/1994	3	3		3	0	
RECONSTRUCTION(O)	1.004	$340,000	2/17/1999				3	3							
RECONSTRUCTION(O)	5.6	$494,200	2/25/2002				3	3		3	3		3	3	
RECONSTRUCTION(O)	3	$730,000	12/11/2001				5	5		5	3		5	3	
ROCKFALL MITIGTN(P)	1.4	$50,000	7/27/1998				2	2		1	1		2	1	
ROCKFALL MITIGTN(P)	0.5	$3,175	10/22/2004												
NEW ROUTE(O)	1.5	$670,000	2/11/2010	$670,000	12/16/2009		4	0							
SAFETY(P)	0.8	$275,000	12/15/2006				4	4							
SAFETY(P)	0.2	$100,000	1/22/2001												
SAFETY(P)	0.5	$330,000	9/1/2011	$330,000	5/4/2012										
SAFETY(P)		$22,500	12/15/2006												
SAFETY(P)	0.25	$900,000	1/5/2009	$600,000	12/20/2007										
BRIDGE REPLACEMENT(P)	1.46	$950,000	9/28/1992				4	4	9/29/1992	4	3		4	0	
GRADE & DRAIN	2.37	$690,000	9/28/1992				6	6	11/14/1992	6	6		6	2	
MAJOR WIDENING(O)	1.8	$500,000	8/14/1991				6	6		6	6		6	5	12/1/1992
RELOCATION(O)	0.2	$75,000	11/16/1990				4	4	11/27/1990	4	4		4	4	
NEW ROUTE(O)	2.7	$400,000	12/20/1997												
NEW ROUTE(O)	11.6	$1,200,000	12/20/1997												
NEW INTERCHANGE(O)	0.7	$80,000	12/20/1997												
SAFETY		$30,000	6/12/1997				1	1							
NEW ROUTE(O)	4.2						6	6	4/25/1989	6	2		6	0	
NEW ROUTE(O)	4.2						2	2	4/23/1990	2	2		2	2	7/1/1991
NEW ROUTE(O)	5						3	3		3	3		3	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
NEW ROUTE(O)	4.9						3	3	10/19/1990	3	0		3	0	
NEW ROUTE(O)	5.4						2	2	10/19/1990	2	2		2	0	
NEW ROUTE(O)	6.2						4	4	8/13/1990	4	4		4	0	
SAFETY(P)	0.3	$119,000	10/30/2013												
CONTINGNCY ACCOUNT(O)		$40,000	1/17/2012												
NEW ROUTE(O)	1.35	$1,150,000	4/8/1993				4	4	1/31/1990	4	2		4	0	9/1/1991
BYPASS(O)	1	$1,600,000	2/10/1999				5	5		5	1		5	0	
NEW ROUTE(O)	0.94	$1,000,000	4/8/1993				4	4	6/13/1992	4	4		4	0	
RECONSTRUCTION(O)	1.7	$530,000	7/19/1996				7	7		7	6		7	1	
SFTY TE IMPR	0.189	$35,000	6/29/1990				2	0		2	0		2	0	
MINR WIDENING	2	$45,000	5/8/1991				2	2		2	0		2	0	3/1/1992
SLIDE REMOVAL		$25,000	12/20/1990				1	1		1	1		1	1	
MAJOR WIDENING(O)	0.45	$520,000	3/5/1998				5	5		5	3		5	1	
SFTY TE IMPR		$25,500	11/25/1991				3	0		3	0		3	0	
MINOR WIDENING(O)	0.4	$80,000	2/6/1997				1	1		1	1		0	0	
MAJOR WIDENING(O)	1.3	$275,000	1/15/1997				5	5		5	3		5	2	
SAFETY-HAZARD ELIM(P)	0.1	$60,000	9/23/1998				3	3		3	3		3	3	
SAFETY		$30,000	6/18/1993				3	3		3	3		3	0	
RELOCATION(O)	1.444	$595,000	11/25/2009				5	5		0	0		0	0	
SAFETY		$40,000	1/20/1995				0	0		0	0		0	0	
SAFETY-HAZARD ELIM(P)	1	$200,000	4/2/1998				4	4		4	4		4	4	
SAFETY-HAZARD ELIM(P)	0.4	$100,000	6/8/2001				3	3		3	1		3	1	
SAFETY-HAZARD ELIM(P)	0.4	$34,348	2/2/2005				4	4		4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$15,000	9/26/1989				3	3	11/27/1990	3	3		3	3	8/1/1991
BRIDGE REPLACEMENT(P)	0.1	$95,000	12/12/1995				4	4		4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$130,000	6/27/1996				5	5		5	5		5	4	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$5,000	7/14/1994				1	1	9/20/1994	1	1		1	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	8/24/1994				3	3	9/20/1994	3	3		3	1	
BRIDGE REPLACEMENT(P)	0.1	$115,000	10/22/1993				4	4		4	4		4	1	
BRIDGE REPLACEMENT(P)	0.1	$60,000	7/11/1996				3	3		3	2		3	2	
BRIDGE REPLACEMENT(P)	0.1	$43,000	9/20/1996				5	5		5	5		5	5	
BRIDGE REPLACEMENT(P)	0.1	$35,000	1/7/2003				1	0							
BRIDGE REPLACEMENT(P)	0.1	$35,000	11/27/1995				2	2		2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$601	10/21/2002				2	2		2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	7/21/1997				3	3		3	2		3	3	
BRIDGE REPLACEMENT(P)	0.1	$45,000	12/23/1991				4	4		4	4		4	4	7/24/1992
BRIDGE REPLACEMENT(P)	0.1	$80,000	11/17/1995				4	4		4	3		4	0	
RECONSTRUCTION(O)	0.3	$40,000	11/16/1995				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$140,287	7/9/2004				5	5		5	5		5	5	
BRIDGE REPLACEMENT(P)	0.1	$70,000	2/7/1997				3	3		3	1		3	1	
BRIDGE REPLACEMENT(P)	0.1	$75,000	9/13/1996				4	4		4	3		4	1	
BRIDGE REPLACEMENT(P)	0.1	$40,000	1/22/1998				2	2		2	1		2	1	
BRIDGE REPLACEMENT(P)	0.3	$110,000	5/15/1998				5	5		5	0		5	0	
BRIDGE REPLACEMENT(P)	0.1	$120,000	8/17/1999				4	4		4	1		4	0	
BRIDGE REPLACEMENT(P)	0.322	$105,000	2/2/2000				3	3		3	1		3	1	
BRIDGE REPLACEMENT(P)	0.1	$60,000	10/22/1998				3	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	6/12/1998				1	1		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$85,000	10/29/2009	$30,000	12/20/2007		2	1		1	1		0	0	
BRIDGE REPLACEMENT(P)	0.09	$50,000	12/22/2000				3	0		3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$78,437	2/20/2005				3	1		3	1		3	1	
BRIDGE REPLACEMENT(P)	0.1	$45,000	2/15/2002				2	2							
BRIDGE REPLACEMENT(P)	0.8	$149,206	3/16/2006				4	4							

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$65,000	3/27/2003				3	3		3	1				
BRIDGE REPLACEMENT(P)	0.1	$86,240	6/30/2005				5	5		5	1				
BRIDGE REPLACEMENT(P)	0.1	$20,000	3/27/2003				1	0							
BRIDGE REPLACEMENT(P)	0.1	$35,000	6/15/2004				2	2							
BRIDGE REPLACEMENT(P)	0.1	$100,000	11/12/2009	$100,000	4/15/2009										
BRIDGE REPLACEMENT(P)	0.1	$160,000	9/14/2012	$125,000	12/20/2007										
BRIDGE REPLACEMENT(P)	0.1	$125,000	8/19/2005				4	4							
BRIDGE REPLACEMENT(P)	0.1	$40,000	3/9/2009	$35,000	12/20/2007										
BRIDGE REPLACEMENT(P)	0.1	$170,000	5/20/2009												
BRIDGE REPLACEMENT(P)	0.1	$140,000	8/11/2009												
BRIDGE REPLACEMENT(P)	0.1	$105,000	11/20/2007	$20,000	10/17/2007										
BRIDGE REPLACEMENT(P)	0.1	$40,000	9/10/2007												
BRIDGE REPLACEMENT(P)	0.1	$45,000	10/29/2007	$35,000	10/17/2007										
BRIDGE REPLACEMENT(P)	0.1	$50,000	1/30/2009	$40,000	12/20/2007										
BRIDGE REPLACEMENT(P)	0.1	$45,000	5/14/2009	$20,000	4/9/2009										
BRIDGE REPLACEMENT(P)	0.1	$250,000	2/23/2009	$150,000	12/20/2007										
BRIDGE REPLACEMENT(P)		$230,000	11/4/2013												
PAVEMENT REHAB-INT(P)	5.9	$121,525	2/24/2006				2	2		2	2		2	2	
PAVEMENT REHAB-INT(P)	7.8	$25,635	2/6/2013												
LANDSLIDE REPAIR(P)	0.3	$100,000	12/19/1999				2	2		2	1		2	0	
SAFETY(P)		$100,000	9/28/2000				4	4		4	1		4	0	
RECONSTRUCTION(O)	1	$460,000	12/11/2000												
NEW ROUTE(O)	1	$590,000	9/6/2007				4	4		4	2				
SAFETY(P)	0.1	$45,000	4/10/2006												
RECONSTRUCTION(O)		$30,000	7/12/2011												
SAFETY(P)	0.1	$380,000	7/11/2010												

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
LANDSLIDE REPAIR(P)		$130,000	6/10/2012	$130,000	11/17/2011										
BRIDGE REPLACEMENT(P)	0.1	$165,000	6/15/1990				5	5	4/4/1992	5	4		5	3	
BRIDGE REPLACEMENT(P)	0.1						4	4	4/4/1991	4	4		4	4	
SAFETY	0.75	$75,000	2/1/1994				1	1	2/3/1994	1	0		1	0	
SAFETY	0.12	$50,000	4/19/1994				1	0		1	0		1	0	
MAJOR WIDENING(O)	1.524	$221,835	3/7/2005				5	5		5	5		5	3	
MAJOR WIDENING(O)	2.5	$1,250,000	4/26/2001				8	8	10/1/1996	8	8		8	4	10/1/2006
MAJOR WIDENING(O)	1.7	$465,000	11/23/1997				5	5		5	4		5	0	
SAFETY		$200,000	3/30/1994				2	2	4/26/1994	2	2		2	2	
RECONSTRUCTION(O)	3.5	$1,580,000	11/2/2005				8	8		8	8		8	4	
RECONSTRUCTION(O)	0.94	$500,000	2/27/2006				5	0		5	0		5	0	
SAFETY-HAZARD ELIM(P)	0.3	$75,000	9/18/1998				4	4		4	4		4	1	
RECONSTRUCTION(O)	1.5	$370,000	6/8/2005				3	3	8/4/2005	3	3		3	2	3/1/2007
SAFETY(P)	0.2	$355,000	11/8/2002				4	4	12/12/2005	4	4		4	4	8/15/2006
ROCKFALL MITIGTN(P)	0.1	$50,000	8/2/2010				4	4		4	4		4	4	
NEW ROUTE(O)		$1,500	5/26/2006												
NEW INTERCHANGE(O)		$1,065,710	12/14/2010	$250,000	8/6/2008		4	4		4	2		4	1	
SAFETY(P)	3.1	$305,000	6/15/2011	$500,000	10/17/2007										
RELOCATION(O)	2.7	$150,000	7/6/1990				5	5	9/21/1990	5	5		5	5	
MAJR WIDENING	0.1	$180,000	10/9/1991				3	3	8/16/1989	3	3		3	3	10/31/1990
RELOCATION(O)	0.4	$10,000	8/1/1991				20	2	9/20/1991	2	2		2	2	
ROCKFALL MITIGTN(P)	0.6	$40,000	9/1/1994				2	2	9/20/1994	2	2		2	2	
RECONSTRUCTION(O)	0.379	$25,000	11/30/1994				2	2		2	2		2	2	
SAFETY		$50,000	1/17/1995				0	0		0	0		0	0	
MAJR WIDENING		$0	6/12/1989				4	0		4	0		4	0	
RELOCATION(O)	0.43	$850,000	9/5/2002				5	5	6/10/2003	5	5		5	1	3/1/2008

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RELOCATION(O)	1.7	$200,000	9/5/2002				5	5	6/10/2003	5	3		5	0	3/1/2008
RELOCATION(O)	1.6	$705,000	8/20/2004				4	4		4	4		4	2	
RELOCATION(O)	2.3	$415,000	7/25/2002				4	4		4	4		4	2	
RELOCATION(O)	2.7	$225,000	4/9/1998				3	3		3	2		3	2	
SAFETY	0.1	$40,000	8/22/1991				5	5	10/2/1991	5	5		5	4	
SAFETY-RR SEPARATN(P)	0.5	$745,000	6/25/2003				6	6	11/13/2003	6	5		6	3	9/15/2006
SFTY TE IMPR	2.1	$260,000	3/24/1993				4	4	6/18/1991	4	4		4	2	
RELOCATION(O)	3	$769,668	5/5/2000				6	6		6	2		6	0	
RELOCATION(O)	2.5	$665,000	5/15/1998				4	4		4	3		4	0	
MAJOR WIDENING(O)	1.3	$1,555,000	10/20/1997				5	5		5	5		5	5	
MAJOR WIDENING(O)	0.1	$100,000	7/29/1997				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.2	$50,000	7/12/1996				6	6		6	6		6	6	
RECONSTRUCTION(O)	2.9	$750,000	10/15/1999				4	4		4	4		4	4	
SAFETY		$25,000	8/27/1993				5	5	4/15/1994	5	5		5	5	
NEW INTERCHANGE(O)		$400,000	4/3/1995				6	6	4/14/1995	6	0		6	0	
RECONSTRUCTION(O)	1.7	$650,000	3/9/2006				5	5		5	5		5	4	
RECONSTRUCTION(O)	0.1	$245,000	5/18/2005				3	3	4/14/2005	3	3		3	1	10/1/2006
SAFETY		$50,000	4/30/1996				1	0		1	1		1		
SAFETY-HAZARD ELIM(P)	0.2	$30,000	12/5/2001				1	1		1	1		1	0	
SAFETY-HAZARD ELIM(P)		$1,000	5/28/2008												
SAFETY-HAZARD ELIM(P)	0.16	$120,000	7/17/2002				4	4		4	4		4	1	
SAFETY-HAZARD ELIM(P)		$30,000	4/6/2011												
SAFETY-HAZARD ELIM(P)	0.63	$170,000	7/21/2006				5	5		5	3		5	1	
MAJOR WIDENING(O)	2	$275,000	3/9/1993				4	4	3/22/1994	4	4		4	1	
MAJOR WIDENING(O)	2.9	$150,000	3/9/1993				4	4	4/25/1994	4	4		4	1	
SAFETY-HAZARD ELIM(P)	0.6	$185,000	6/5/2002				5	5		5	2		5	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY-HAZARD ELIM(P)	0.2	$0	6/8/2006												
BRIDGE REPLACEMENT(P)	0.1	$105,000	9/13/1993				4	4	11/29/1993	4	4		4	1	
BRIDGE REPLACEMENT(P)	0.1	$100,000	9/13/1993				5	5	10/25/1993	5	5		5	1	
BRIDGE REPLACEMENT(P)	0.1	$20,000	7/5/1994				1	1	10/25/1994	1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$145,000	6/6/1994				4	4	6/28/1994	4	2		4	1	
BRIDGE REPLACEMENT(P)	0.1	$35,000	7/5/1994				3	3	9/30/1994	3	3		3	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	7/5/1994				3	3	9/30/1994	3	3		3	0	
BRIDGE REPLACEMENT(P)	0.1	$35,000	7/5/1994				3	3	3/7/1995	3	3		3	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	7/5/1994				3	3	9/30/1994	3	3		3	1	
NEW ROUTE(O)	0.8	$200,000	1/21/1998				6	6		6	3		6	0	
BYPASS(O)	0.9	$550,000	5/26/1998				6	6		6	3		6	0	
BRIDGE REPLACEMENT(P)	0.1	$30,000	3/4/1994				2	2	4/8/1994	2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$95,000	9/15/1995				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$300,000	12/12/1994				5	5	1/4/1995	5	4		5	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	9/15/1995				2	2		2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$110,000	4/26/1994				4	4	6/28/1994	4	4		4	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	6/14/1994				4	4	9/2/1994	4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$150,000	10/20/1995				5	5		5	5		5	4	
BRIDGE REPLACEMENT(P)	0.1	$80,000	9/15/1995				3	3		3	3		3	2	
BRIDGE REPLACEMENT(P)	0.1	$80,000	9/15/1995				3	3		3	3		3	2	
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/22/1996				2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$40,000	10/20/1995				2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$15,000	11/22/1996				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$15,000	11/24/1997				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	7/28/1997				3	3		3	3		3	1	
BRIDGE REPLACEMENT(P)	0.1	$50,000	2/25/1998				2	2		2	2		2	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$260,000	3/22/1999				4	4		4	4		4	3	
BRIDGE REPLACEMENT(P)	0.1	$12,606	2/9/2005				2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.104	$75,000	10/30/1998				4	4		4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$75,000	7/31/2000				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$17,315	2/28/2003				4	4		4	2		4	2	
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/22/1996				3	3		3	2		3	2	
BRIDGE REPLACEMENT(P)	0.1	$4,895	12/24/2002				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.102	$75,000	8/12/1998				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$6,482	8/13/2001				2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$33,444	5/6/1999				4	4		4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$50,000	10/23/2002				3	3		3	3		3	0	
BRIDGE REPLACEMENT(P)	0.1	$695,000	11/30/2006				5	5	8/3/2004	5	5		5	4	8/15/2006
BRIDGE REPLACEMENT(P)	0.1	$155,000	7/25/2003				4	4	3/15/2004	4	3		4	1	2/1/2007
BRIDGE REPLACEMENT(P)	0.1	$15,011	1/19/2005				3	3		3	2		3	2	
BRIDGE REPLACEMENT(P)	0.1	$25,000	1/9/2003				3	3		3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/22/2004				4	4	2/24/2005	4	4		4	4	3/1/2007
BRIDGE REPLACEMENT(P)	0.1	$210,000	11/22/2004				4	4	2/22/2005	4	4		4	4	7/31/2006
BRIDGE REPLACEMENT(P)	0.1	$65,000	10/26/2004				4	4		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$100,000	6/15/2004				3	0		3	3		3	2	
BRIDGE REPLACEMENT(P)	0.1	$340,000	4/4/2007				4	4		4	4		4	1	
BRIDGE REPLACEMENT(P)	0.1	$50,000	6/20/2008	$50,000	12/20/2007		2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$155,000	4/27/2006				4	4	5/16/2006	4	4		4	2	2/15/2007
BRIDGE REPLACEMENT(P)	0.1	$75,000	4/27/2006				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$110,000	7/1/2008	$175,000	12/20/2007		5	5		5	5		5	2	
BRIDGE REPLACEMENT(P)	0.1	$50,000	10/11/2007				3	3		3	3		3	1	
BRIDGE REPLACEMENT(P)	0.1	$310,000	8/10/2009				5	5		5	5		5	1	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$85,000	4/16/2012	$85,000	11/4/2011		3	3		3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$80,000	8/31/2012				2	2		2	2		2	0	
TRANSP ENHANCEMENT(P)		$76,000	5/4/2012												
LANDSLIDE REPAIR(P)	0.1	$25,000	3/14/2001				2	2		2	2		2	2	
LANDSLIDE REPAIR(P)	0.2	$50,000	9/30/2000				2	2		2	2		2	1	
LANDSLIDE REPAIR(P)	0.2	$10,000	8/30/2000				1	1		1	1		1	1	
LANDSLIDE REPAIR(P)	0.3	$20,000	12/6/2000				1	1		1	1		1	1	
ROCKFALL MITIGTN(P)	0.2	$200,000	4/13/2009				4	4		4	2		4	2	
BRIDGE REPLACEMENT(P)	0.1	$25,000	3/31/2001				3	3		3	3		3	3	
ROCKFALL MITIGTN(P)	1.5	$135,000	8/9/2006				2	2		2	2		2	2	
SPOT IMPROVEMENTS(O)	2.6	$650,000	8/9/2006				3	3		3	1		3	0	
NEW ROUTE(O)		$500,000	1/3/2006												
BRIDGE REPLACEMENT(P)	0.1	$140,000	11/8/2002				4	4		4	4		4	4	
NEW ROUTE(O)		$65,000	1/24/2001												
NEW ROUTE(O)	1.5	$315,000	2/21/1992				8	8	1/7/1991	8	1		8	0	10/1/1991
NEW ROUTE(O)	1.42	$930,000	6/21/1995				8	8		8	7		8	7	
I-CHANGE RECONST(O)	0.1	$595,000	2/15/2000				6	0		6	0		6	0	
MAJOR WIDENING(O)	5.4	$200,000	7/19/2002				1	1	12/9/2002	1	1	2/28/2003	1	1	7/11/2003
RELOCATION(O)	0.8	$869,000	6/29/1994				6	6		6	6		5	2	
MAJOR WIDENING(O)	3.11	$1,277,776	8/5/2004				5	5		5	0		5	0	
NEW ROUTE(O)	1.11	$350,000	8/20/1992				5	5		5	0		5	0	
NEW ROUTE(O)	1.76						7	7	9/20/1990	7	7		7	0	
MINOR WIDENING(O)	0.8	$250,000	6/22/1995				5	5		5	1		5	0	
ROCKFALL MITIGTN(P)	0.5	$40,000	8/17/2000				3	0		3	0		3	0	
NEW ROUTE(O)	0.5	$92,000	7/25/2002												
NEW ROUTE(O)	0.5	$60,000	7/14/2010	$50,000	12/20/2007		0	0							

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$12,000	4/25/1990				2	2		2	2		2	0	
BRIDGE REPLACEMENT(P)	0.1						6	6		6	3		6	1	
BRIDGE REPLACEMENT(P)	0.1	$10,000	9/12/1990				2	2	11/13/1990	2	2		2	2	
NEW ROUTE(O)	1.2	$770,000	9/30/2010				5	5		5	5		5	3	
FLOODWALL PROTECTION	2.27	$235,000	7/1/1994				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.2	$125,000	9/13/1991				5	5		5	5		5	4	
RECONSTRUCTION(O)	5.2	$1,290,000	7/26/2010												
MAJOR WIDENING(O)	2.5	$650,000	9/13/1993				5	5		5	5		5	3	
SAFETY	0.1	$40,000	4/26/1994				4	4	5/19/1994	4	4		4	4	12/1/1994
RECONSTRUCTION(O)	3.7	$1,000,000	12/20/1997				5	5		5	2		5	0	
NEW ROUTE(O)		$1,250,000	1/11/2012					0							
SAFETY(P)	0.284	$150,000	6/5/2013	$210,000	11/2/2009			0							
BRIDGE REPLACEMENT(P)	0.1	$5,000	2/20/1990				2	2		2	2		2	0	
BRIDGE REPLACEMENT(P)	0.21	$87,000	2/25/1992				5	5		5	1		5	0	
BRIDGE REPLACEMENT(P)	0.45	$63,000	5/28/1987				0	0		0	0		0	0	
MAJOR WIDENING(O)	1.49	$350,000	7/5/1994				5	5	8/12/1994	5	5		5	5	10/1/1996
MINOR WIDENING(O)	1.42	$500,000	9/12/1994				8	8	8/17/1993	8	8		8	8	12/30/1996
RECONSTRUCTION(O)	0.3	$50,000	8/8/2000												
MAJOR WIDENING(O)	2.6	$93,000	6/28/1990				3	3	7/13/1990	3	3		3	0	
RELOCATION(O)	3.1	$500,000	8/8/2000				4	0		4	0		4	0	
MINOR WIDENING(O)	0.7	$75,000	6/21/1995				4	4		4	4		4	4	12/12/1996
MAJOR WIDENING(O)	0.8	$125,000	7/19/1996				5	5		5	4		5	0	
MAJOR WIDENING(O)	2.4	$575,000	10/14/1997				5	5		5	1				
MAJOR WIDENING(O)	3.8	$1,095,000	9/26/2008				5	5		5	1				
MAJOR WIDENING(O)	3.8	$425,000	8/13/2002				4	4		4	4		4	4	
RELOCATION(O)	4.12	$500,000	8/27/1998				11	11		11	8		11	6	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RELOCATION(O)	5.3	$1,765,000	4/25/2005				6	6		6	6		6	6	
RELOCATION(O)	6.8	$1,350,000	8/22/2007												
RELOCATION(O)	2.9	$1,565,000	5/14/2009				4	4	3/1/2007	4	4	8/2/2011	4	4	6/1/2012
RELOCATION(O)	4.4	$775,000	2/16/2006												
RELOCATION(O)	6.6	$830,000	9/13/2001												
MAJR WIDENING	2.42						3	3	5/15/1973	3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$15,000	12/1/1989				4	4		4	4		4	0	
BRIDGE REPLACEMENT(P)	0.1	$5,208	12/8/2004				3	3		3	3		3	3	
SAFETY-HAZARD ELIM(P)	0.18	$35,500	9/7/2004												
SAFETY-HAZARD ELIM(P)	0.34	$16,000	10/23/2006												
SAFETY-HAZARD ELIM(P)	0.31	$70,000	11/5/2004												
MINOR WIDENING(O)	0.71	$81,000	9/1/1994				4	4		4	1		4	0	
SAFETY(P)	0.4	$72,773	3/5/2002				4	0		4	0		4	0	
SAFETY(P)	0.2	$35,000	4/19/1999				6	0		6	0		6	0	
BRIDGE REPLACEMENT(P)	0.1	$20,000	8/14/1991				4	4		4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$14,000	10/9/1991				2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$20,000	4/20/1992				2	2		2	2		2	1	
BRIDGE REPLACEMENT(P)	0.1	$40,000	12/5/1994				3	3	2/10/1995	3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$45,000	4/5/1995				4	4	3/7/1994	4	4	2/1/1996	4	3	
BRIDGE REPLACEMENT(P)	0.1	$30,000	7/5/1994				2	2	10/4/1994	2	1		2	0	
BRIDGE REPLACEMENT(P)	0.1	$45,000	5/27/1993				4	4	8/30/1993	4	0		4	0	
BRIDGE REHAB(P)	0.1	$327,000	1/30/2006				5	5		5	4		5	2	
BRIDGE REPLACEMENT(P)	0.1	$165,000	2/5/1996				5	5		5	3		5	3	
BRIDGE REPLACEMENT(P)	0.1	$51,240	3/31/2004				3	3		3	3		3	3	2/1/1999
BRIDGE REPLACEMENT(P)	0.1	$40,000	6/6/1994				3	3	6/29/1994	3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$40,000	9/1/1995				5	5		5	4		5	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/22/1996				2	2		2	2	3/25/1997	2	2	3/4/1997
BRIDGE REPLACEMENT(P)	0.1	$50,000	4/1/1997				4	4		4	4		4	4	
BRIDGE REPLACEMENT(P)	0.1	$50,000	3/21/1995				4	4	7/10/1995	4	4	11/1/1996	4	2	
BRIDGE REPLACEMENT(P)	0.1	$125,273	8/10/2005				4	4		4	1		4	0	
BRIDGE REPLACEMENT(P)	0.1	$45,000	1/2/1997				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	11/24/1997				5	0		5	1		0	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	5/22/1996				3	3		1	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$27,000	6/26/2002				2	2		2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$85,000	2/27/2002				4	0		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.282	$28,088	2/1/2005				4	4		4	2		0	0	
BRIDGE REPLACEMENT(P)	0.216	$75,000	5/15/1998				4	4		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$2,000	9/4/1997				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.062	$20,000	5/15/1998				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$55,000	7/15/2005												
BRIDGE REPLACEMENT(P)	0.1	$70,000	10/30/2006												
BRIDGE REPLACEMENT(P)	0.1	$111,000	5/12/2008												
BRIDGE REPLACEMENT(P)	0.1	$45,000	12/14/2006												
BRIDGE REPLACEMENT(P)	0.1	$90,000	4/4/2007												
BRIDGE REPLACEMENT(P)	0.1	$30,000	12/19/2002												
BRIDGE REPLACEMENT(P)	0.1	$70,000	5/12/2008												
BRIDGE REPLACEMENT(P)	0.1	$75,000	6/28/2007				4	4		4	3		4	3	
BRIDGE REPLACEMENT(P)	0.1	$120,000	11/12/2009												
BRIDGE REPLACEMENT(P)	0.1	$45,000	10/18/2010	$25,000	12/20/2007		2	2		2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$150,000	5/6/2011	$140,000	11/17/2009										
BRIDGE REPLACEMENT(P)	0.1	$70,000	1/31/2014	$55,000	11/1/2013										
BRIDGE REPLACEMENT(P)	0.1	$40,000	7/8/2002				2	0		2	0			0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$30,000	7/8/2002				1	1		1	0		1	0	
BRIDGE REPLACEMENT(P)	0.1	$20,000	7/8/2002												
BRIDGE REPLACEMENT(P)		$10,000	3/30/2011				1	1	3/14/2012	1	1		1	1	5/15/2012
ROCKFALL MITIGTN(P)	0.3	$20,000	6/8/2005												
ROCKFALL MITIGTN(P)	2	$150,000	12/1/2000												
NEW ROUTE(O)		$200,000	1/7/2003												
NEW ROUTE(O)		$738,625	9/19/2006				4	4		4	1		4	3	
BRIDGE REPLACEMENT(P)	0.1	$165,000	6/8/2012	$100,000	11/2/2009			0							
MINOR WIDENING(O)	0.1	$100,000	12/16/2006												
SPOT IMPROVEMENTS(O)		$365,000	5/9/2012				3	3		3	3		3	0	9/21/2012
NEW ROUTE(O)		$300,000	4/4/2012	$200,000	11/22/2011		5	5	2/8/2012	5	3		5	0	
MINOR WIDENING(O)		$90,000	4/4/2012				1	1	10/3/2011	3	1		3	0	
BRIDGE REPLACEMENT(P)		$6,000	7/28/2011				1	1					1	1	3/21/2011
BRIDGE REPLACEMENT(P)		$85,000	6/15/2012	$60,000	11/4/2010		5	5	8/18/2011	2	2		3	3	
NEW ROUTE(O)		$323,100	12/18/2013												
BRIDGE REPLACEMENT(P)		$10,000	9/13/2011												
PAVEMENT REHAB-PRI(P)		$15,000	1/28/2013												
NEW ROUTE(O)	0.5	$10,000	1/24/2001												
SAFETY(P)	0.2	$700,000	2/21/2011				4	4		4	4		4	3	
BRIDGE REPLACEMENT(P)	0.2	$400,000	5/24/1990				5	5	1/28/1990	5	5		5	4	
BRIDGE REPLACEMENT(P)	0.1	$30,000	6/14/1991				3	3	7/17/1991	3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$15,000	11/16/1990				4	4	12/12/1990	4	3		4	0	
BRIDGE REPLACEMENT(P)	0.1	$10,000	7/5/1989				2	2	12/14/1988	2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$80,000	8/24/1990				5	5	10/1/1990	5	5		5	5	2/15/1992
BRIDGE REPLACEMENT(P)	0.1	$100,000	2/8/1994				4	4	3/8/1994	4	0		4	0	
SAFETY(P)	1	$70,000	6/6/2005				0	0		0	0		0	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
RELOCATION(O)	2.8	$1,861,388	3/9/2004				5	5	10/18/1991	5	3		5	0	
RELOCATION(O)	2.77	$300,000	8/2/1994				2	2	8/22/1991	2	2		2	0	7/20/1993
RELOCATION(O)	2.57	$1,241,260	8/3/2004				7	7	5/7/1993	7	0		7	0	
RELOCATION(O)	1.23	$800,000	7/13/1993				6	6	9/15/1993	6	0		6	0	
RELOCATION(O)	1.23	$800,000	8/6/1993				7	7	10/14/1993	7	0		7	0	
NEW ROUTE(O)	0.5	$95,000	5/29/2009	$150,000	10/17/2007										
RECONSTRUCTION(O)		$235,000	9/12/2006							4	3				
NEW ROUTE(O)		$0	11/12/2004												
RECONSTRUCTION(O)	0.2	$24,306	6/7/2005				5	5		5	4		5	4	
RECONSTRUCTION(O)	0.1	$510,000	11/1/2007				5	3		5	3		5	0	
BRIDGE REPLACEMENT(P)	0.1	$63,000	10/22/1991				3	3	12/16/1991	3	3		3	3	
BRIDGE REPLACEMENT(P)	0.1	$30,000	10/18/1991				2	2	12/16/1991	2	2		2	2	
RELOCATION(O)	1.3	$3,100,000	2/4/2003				8	8		8	5		8	3	
RECONSTRUCTION(O)	1	$200,000	9/18/1998				5	5		5	2		5	0	
RELOCATION(O)	0.379	$113,000	12/5/1989				5	5	1/19/1990	5	5		5	5	5/15/1991
BRIDGE REPLACEMENT(P)	0.06	$40,000	9/21/1988				3	3	12/1/1988	3	0		3	0	
RECONSTRUCTION(O)	1.2	$253,253	3/29/2005				5	5		5	5		5	3	
NEW ROUTE(O)	2.99	$2,000,000	2/16/1990				8	8	5/8/1989	8	7		8	1	
SAFETY	1.1	$820,000	4/19/1995				7	7	7/19/1991	7	7		7	0	
SPOT IMPROVEMENTS(O)	0.9	$350,000	4/27/1995				4	4		4	4		4	1	
RELOCATION(O)	2.5	$1,500,000	9/10/1998				11	11		11	10		11	5	
RELOCATION(O)	0.9	$2,000,000	6/2/1999				8	8		8	4		8	3	
RELOCATION(O)	1.3	$420,000	3/27/2013				9	9		9	2		9	5	
RELOCATION(O)	2.2	$1,000,000	4/11/2002				9	9		9	0		9	0	
RELOCATION(O)	0.8	$2,000,000	4/16/2002				11	11		11	6		0	0	
RELOCATION(O)	3.1	$1,475,000	11/29/2011				12	12		0	0		0	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$1,250,000	4/7/2009	$500,000	11/2/2007		4	4		4	3		4	0	
RELOCATION(O)	2.6	$3,600,000	4/28/2008				13	13		0	0		0	0	
RELOCATION(O)	4.1	$1,401,824	7/24/2008				9	9		9	8		9	8	10/1/1999
SAFETY	0.38	$100,000	6/22/1992				4	4	1/8/1993	4	4		4	3	
MINR WIDENING	0.035	$15,200	11/14/1991				0	0		0	0		0	0	
RECONSTRUCTION(O)	0.4	$50,000	4/24/1996				2	0		2	0		2	0	
RECONSTRUCTION(O)	0.2	$150,000	5/8/1995				4	4		4	4		4	2	
RECONSTRUCTION(O)	0.6	$450,000	3/10/1995				4	4		4	4		4	2	
RECONSTRUCTION(O)	0.3	$50,000	3/10/1995				0	0		0	0		0	0	
NEW ROUTE(O)		$20,000	1/24/2001				5	0		5	0		5	0	
RELOCATION(O)	0.8	$685,000	2/21/2011				9	9		9	3		0	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	10/15/1999				3	3		3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$300,000	8/8/2000				6	6		6	3		6	1	
BRIDGE REPLACEMENT(P)	0.1	$100,000	4/22/2003				5	5		5	4		5	2	
SAFETY(P)	0.061	$100,000	6/5/2003				0	0		0	0		0	0	
RECONSTRUCTION(O)	4	$4,500,000	10/23/2007	$3,000,000	10/17/2007		0	0		0	0		0	0	
RECONSTRUCTION(O)	0.4	$480,000	2/21/2011				6	6		6	2				
RELOCATION(O)							0	0		0	0		0	0	
RECONSTRUCTION(O)	0.1	$50,000	5/15/1998				5	5		5	2	3/30/1999	5	0	6/30/1999
RECONSTRUCTION(O)	0.7	$600,000	6/25/1999				4	4		4	3	7/15/1999	4	3	
RECONSTRUCTION(O)	1.1	$1,020,000	12/14/2000				4	4		4	3		4	2	
MAJOR WIDENING(O)	2.5	$1,025,000	3/22/2010				7	7		7	5	2/15/1999	7	0	4/15/1999
DESIGN ENGINEERING(O)		$350,000	2/21/2011				8	8		8	3		8	1	
RECONSTRUCTION(O)	0.2	$251,000	6/24/2008												
RECONSTRUCTION(O)	0.2	$100,000	8/17/1999				3	3		3	2		3	1	
RECONSTRUCTION(O)	2.4	$1,590,000	2/21/2011				7	7							

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
NEW ROUTE(O)	3.8	$5,848,000	7/1/2009	$2,500,000	10/17/2007		0	0							
NEW ROUTE(O)	3.3	$1,311,798	11/28/2005				6	6		6	2	2/28/1999	6	0	5/1/1999
RECONSTRUCTION(O)	1.5	$200,000	2/21/2011				4	4		4	2				
RELOCATION(O)	2.3	$1,200,000	11/24/1997				8	8		8	0		8	0	
RELOCATION(O)	1.9	$2,000,000	11/24/1997				8	8		8	0	4/30/1999	8	0	9/15/1999
RELOCATION(O)	1.8	$1,103,688	2/19/2009				5	5		5	5		5	5	
RELOCATION(O)	1.7	$3,396,312	3/5/2008				8	8		8	0		8	0	
RELOCATION(O)	2.05						7	7	2/24/1992	7	7		7	7	
RELOCATION(O)	2.44	$3,283,360	6/23/2004				7	0		7	0		7	0	
RELOCATION(O)	6.33	$1,470,000	3/27/2013				0	0		0	0		0	0	
NEW ROUTE(O)	1	$990,000	4/12/2005				5	5		5	0		5	0	
MAJOR WIDENING(O)	2.7	$870,000	8/4/1992				9	9	8/28/1991	9	6		9	2	
NEW ROUTE(O)		$70,000	9/25/2000				2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$210,622	4/1/2005				5	5		5	1			0	
GRADE DRAIN & SURFAC	15.9	$3,200,000	8/31/1987				0	0		0	0		0	0	
RELOCATION(O)	0.523						9	9	3/12/1990	9	9		9	0	
RELOCATION(O)	1.828						8	8	3/12/1990	8	8		8	0	
RELOCATION(O)	2.63						7	7	2/17/1990	7	7		7	0	
RELOCATION(O)	1.733	$790,000	10/15/1992				7	7	6/12/1991	7	4		7	4	
RELOCATION(O)	2.64	$685,000	6/17/1993				7	7	4/9/1992	7	6		7	4	
NEW ROUTE(O)	1.3						8	8	3/1/1990	8	8		8	0	
RELOCATION(O)	0.3	$850,000	10/15/1992				5	5	4/4/1991	5	0		5	0	
RELOCATION(O)	1.34	$935,000	11/18/1993				7	7	7/28/1992	7	7		7	1	
SAFETY-HAZARD ELIM(P)	0.2	$185,000	2/24/2010	$125,215	11/2/2007		5	5		5	0		5	0	
SAFETY-HAZARD ELIM(P)	0.1	$200,000	4/18/2003				5	5		5	1				
BRIDGE REPLACEMENT(P)	0.1	$10,000	3/23/1990				0	0		0	0		0	0	

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
SAFETY-HAZARD ELIM(P)	0.938	$35,920	12/9/2005												
BRIDGE REPLACEMENT(P)	0.1	$40,000	9/4/1992				2	2	11/11/1992	2	2		2	2	
SAFETY(P)	0.1	$40,000	6/25/1999				2	2		2	0	4/1/1999	2	0	9/30/1999
BRIDGE REPLACEMENT(P)	0.1	$110,000	9/8/1992				5	5	3/15/1993	5	0		5	0	
BRIDGE REPLACEMENT(P)	0.1	$100,000	9/1/1994				3	3	10/4/1994	3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$190,000	6/18/2003				4	4							
BRIDGE REPLACEMENT(P)	0.1	$450,000	2/15/2005				5	5		5	1				
BRIDGE REPLACEMENT(P)	0.1	$28,689	1/25/2005				4	0							
BRIDGE REPLACEMENT(P)	0.1	$100,000	7/6/2006				0	0							
BRIDGE REPLACEMENT(P)	0.1	$100,000	8/2/1994				4	4	10/6/1994	4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$45,000	8/24/1993				3	3	10/25/1993	3	0		3	0	
BRIDGE REPLACEMENT(P)	0.1	$60,000	7/13/1993				3	3	8/13/1993	3	3		3	10	
BRIDGE REPLACEMENT(P)	0.1	$40,000	9/1/1994				2	2	10/4/1994	2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	5/15/1998				4	4		4	2	3/15/1999	4	0	9/15/1999
BRIDGE REPLACEMENT(P)	0.1	$50,000	7/17/1995				2	0		2	0		2	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	8/3/1999				3	3		3	2		3	2	
BRIDGE REPLACEMENT(P)	0.1	$50,000	8/3/1999				3	3		3	2		3	2	
BRIDGE REPLACEMENT(P)	0.1	$120,000	1/10/2002				5	0		5	0		5	0	
BRIDGE REPLACEMENT(P)	0.1	$175,427	10/7/2004				3	4		3	2		3	1	
BRIDGE REPLACEMENT(P)	0.1	$150,000	8/3/1999				5	5		5	0		5	0	
BRIDGE REPLACEMENT(P)	0.091	$180,352	3/19/2001				5	5		5	5	5/30/2000	5	0	9/30/2000
BRIDGE REPLACEMENT(P)	0.093	$100,000	10/22/1998				5	5		5	5	5/30/2000	5	0	9/30/2000
BRIDGE REPLACEMENT(P)	0.1	$75,000	7/31/2000				4	0		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$10,160	3/14/2006				4	4		4	1		4	1	
BRIDGE REPLACEMENT(P)	0.1	$100,000	4/5/1999				0	0		0	0		0	0	9/15/1999
BRIDGE REPLACEMENT(P)	0.1	$75,000	7/21/1997				4	4		4	3		4	3	9/30/1999

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$100,000	5/8/1997				1	1		1	1		1	1	
BRIDGE REPLACEMENT(P)	0.1	$75,000	4/12/1996				0	0		0	0		0	0	
BRIDGE REPLACEMENT(P)	0.1	$75,000	12/12/1997				5	5		5	4		5	0	5/1/2000
BRIDGE REPLACEMENT(P)	0.1	$103,310	6/23/2004				1	1		1	0		1	0	
BRIDGE REPLACEMENT(P)	0.1	$69,225	10/18/2005				6	6		6	0		6	0	
BRIDGE REPLACEMENT(P)	0.1	$74,000	5/8/1997				2	2		2	2		2	2	
BRIDGE REPLACEMENT(P)	0.1	$171,033	12/1/2004				4	4		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$50,000	8/3/1999				3	3		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$355,000	6/29/2004				4	0							
BRIDGE REPLACEMENT(P)	0.1	$150,000	1/18/2002				4	4							
BRIDGE REPLACEMENT(P)	0.1	$65,941	10/7/2004				4	4		4	1				
BRIDGE REPLACEMENT(P)	0.1	$9,425	10/7/2004				4	0							
BRIDGE REPLACEMENT(P)	0.1	$125,000	4/6/2005				3	3							
BRIDGE REPLACEMENT(P)	0.1	$75,000	4/18/2003				4	4		4	1				
BRIDGE REPLACEMENT(P)	0.1	$115,000	11/29/2005				0	0							
BRIDGE REPLACEMENT(P)	0.1	$175,000	7/30/2007				0	0							
BRIDGE REPLACEMENT(P)	0.1	$215,000	3/17/2004				4	4		4	0		4	0	
BRIDGE REPLACEMENT(P)	0.1	$285,000	10/11/2011												
BRIDGE REPLACEMENT(P)	0.1	$140,000	8/2/2010	$170,000	11/2/2007					1	1	4/1/2013			
BRIDGE REPLACEMENT(P)	0.1	$60,000	3/25/2010	$90,000	10/26/2007		3	3		2	2		3	3	
BRIDGE REPLACEMENT(P)	0.1	$200,000	3/9/2009	$150,000	10/26/2007										
BRIDGE REPLACEMENT(P)	0.1	$60,000	5/5/2008	$60,000	11/2/2007		1	1					1	1	
BRIDGE REPLACEMENT(P)	0.1	$125,000	1/3/2007												
BRIDGE REPLACEMENT(P)	0.1	$57,000	4/29/2010	$100,000	10/26/2007										
BRIDGE REPLACEMENT(P)	0.1	$340,000	10/18/2010	$130,000	10/26/2007										
BRIDGE REPLACEMENT(P)	0.1	$245,000	12/15/2011	$245,000	11/23/2011										

Type of Work	Length	U Phase Auth. Amount	Phase Authorization Date	Current Utility Estimate	Current Estimate Date	Utility Clearance Date	U Negotiations Initiated	U Negotiations Completed	U Negotiations Complete Date	U Agreements Initiated	U Agreements Completed	U Agreements Complete Date	U Relocations Initiated	U Relocations Completed	U Relocations Complete Date
BRIDGE REPLACEMENT(P)	0.1	$230,000	11/15/2011	$150,000	11/2/2007										
BRIDGE REPLACEMENT(P)	0.1	$45,000	9/14/2010	$150,000	10/29/2009										
BRIDGE REPLACEMENT(P)	0.1	$110,000	10/18/2010	$200,000	11/2/2007										
BRIDGE REPLACEMENT(P)	0.1	$670,000	8/8/2008	$250,000	1/28/2008										
BRIDGE REPLACEMENT(P)	0.1	$100,000	8/18/2008	$150,000	11/2/2007										
BRIDGE REPLACEMENT(P)		$90,000	1/10/2011												
BRIDGE REPLACEMENT(P)	0.1	$65,000	2/18/2014	$80,000	11/22/2011										
BRIDGE REPLACEMENT(P)	0.1	$16,000	10/15/1999												
BRIDGE REPLACEMENT(P)		$24,000	5/9/2011												
ROCKFALL MITIGTN(P)	0.15	$146,516	4/6/2005				4	0							
ROCKFALL MITIGTN(P)	0.45	$692	11/3/2004				4	0							
LANDSLIDE REPAIR(P)	2	$85,000	6/21/2004				3	3							
SAFETY(P)	0.2	$357,000	2/21/2011				7	7		7	1		7	0	
BRIDGE REPLACEMENT(P)		$250,000	4/22/2003				5	5		5	2		5	0	
BRIDGE REPLACEMENT(P)	0.1	$125,000	9/7/2010	$150,000	11/2/2007										
PAVEMENT REHAB-PRI(P)		$75,000	5/15/1996												

Appendix J: Glossary

Glossary

Utility Coordination – The active effort to communicate, share information, and interact productively with all applicable stakeholders regarding the utility involvement, adjustment, and relocation during all phases (planning, design, construction, operation, and maintenance) of the delivery of a transportation project (Thorne, et. al. 1993).

Utility Company / Utility Owner – The public or private entity in ownership of a utility. Utility owner and utility company are often used interchangeably but because some municipalities control ownership of utilities, it is more appropriate to use the term "utility owner" for these entities.

Subsurface Utility Engineering (SUE) – is an engineering practice combining civil engineering, surveying, and geophysics to assess an located utilities with project limits according to quality levels that can also be thought of as risk levels. Project designers/owners can assign quality levels A (highest level) through D (lowest level) according to the risks associated with a particular utility an d potential impact. The quality levels determine the amount and accuracy desirable for a particular underground utility.

Utility Conflict Matrix/Management (UCM) – are frameworks to collect and store potential utility impacts of a transportation project as well as track resolutions and assist in identifying optimal solutions.

Damage Prevention Councils / Utility Coordination Councils – are state, regional, or local based councils of contractors, utility owners, and other stakeholders who meet regularly to share information, discuss utility damage prevention issues, host large project forums, and promote the use of one-call centers with the goal of promoting safety and protecting utility infrastructure.

One-Call Centers – are typically overseen by a state board and may operate in various fashions. They main objective is to track potential disturbances to underground utilities (construction and maintenance) as a free service to those making impacts and with fees paid by utility owners who are members of the center.

BIBLIOGRAPHY

1. 23 CFR 645 and specifically, Subpart B, Subsection 645.211
2. A Guide for Accommodating Utilities within Highway Right-of-Way. American Association of State Highway and Transportation Officials, Washington, D.C., 2005
3. A Policy for Accommodating Utilities within Freeway Right-of-Way. American Association of State Highway and Transportation Officials, Washington, D.C., 2005.
4. *AASHTO Guide for Design-build Procurement*. American Association of State Highway and Transportation Officials. Washington, DC. 2008.
5. AGC (Associated General Contractors). *Authorization Maps*. Accessed: September, 2015. https://www.agc.org/cm-risk-state-state-map
6. Anderson, S., Quiroga, C., Overman, J., Choi, K., Kermanshachi, S., Goodrum, P., Taylor, T., and Li, Y. Effective Project Scoping Practices to Improve On-Time and On-Budget Delivery of Highway Projects. NCHRP Report 821, Transportation Research Board of National Academies, Washington, D.C., 2016.
7. Anspach, J. and Murphy, R. *Subsurface Utility Engineering Information Management for Airports*. ACRP Synthesis 34, Transportation Research Board of National Academies, Washington, D.C., 2012.
8. Anspach, J.H., *Utility Location and Highway Design*. NCHRP Synthesis 405. Transportation Research Board of the National Academies, Washington, D.C., 2010.

9. ASCE (American Society of Civil Engineers). *Institute Reports*. Newsletter, April 2017. Accessed: August, 2018. http://asce-sf.org/april-2017-institute-reports/

10. Building on 25 Years. Construction Industry Institute. Austin, Texas. 2008. 21p.

11. CI/ASCE38-02. *Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data*. American Society of Civil Engineers. 2002.

12. Code of Federal Regulations, Title 23, Part 645-Utilities, Subparts A and B, Washington, D.C., 2016 (online). http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title23/23cfr645_main_02.tpl. Accessed April 2016.

13. DBIA (Design-Build Institute of America). http://www.dbia.org/about/Pages/DBIA-Milestone-The-Maps.aspx. Accessed: September, 2015.

14. Design-Build Institute of America. *Website accessed August 23,2017* https://www.dbia.org/about/Pages/What-is-Design-Build.aspx

15. *Design-build Procurement and Administration Guide*. 3rd Edition. Arizona Department of Transportation. Phoenix, AZ. 2007.

16. *Design-Build Utility Coordination*. White Paper. Georgia DOT.

17. Ellis, R. *Development of Improved Strategies for Avoiding Utility Related Delays During FDOT Highway Construction Projects*. University of Florida, FDOT Contract Number FL DOT BC 354-52 Final Report. July, 2003.

18. Ellis, R., Venner, M., Paulsen, C., Adams, G., and Vandenbergh, K. *Integrating the Priorities of Transportation Agencies and Utility Companies*. SHRP 2 Report

S2-R15-RW.Transportation Research Board of National Academies, Washington, D.C., 2009.

19. FDOT (Florida DOT). *Guide for Reducing Contractor Risk Associated with Utilities on Design-Build* Projects. Accessed: October, 2017. http://www.dot.state.fl.us/construction/DesignBuild/DBRules/DB%20Utility%20guidelines.pdf

20. Gale, W. and Hammerschmidt, A., Technologies to Support Storage, Retrieval, and Use of 3-D Utility Location Data. SHRP 2 Report S2-R01A-RW-1.Transportation Research Board of National Academies, Washington, D.C., 2015.

21. GDOT (Georgia DOT). *Design-Build Utility Coordination*. http://www.dot.ga.gov/PartnerSmart/DesignManuals/DesignBuild/10-Design-Build%20Utility%20Coordination%20White%20Paper.pdf September, 2015.

22. GDOT (Georgia DOT). *Utility Risk Management Plan and Risk Matrix*. Georgia Department of Transportation. Accessed: July 28, 2017. http://mydocs.dot.ga.gov/info/gdotpubs/Publications/6863-12c.xlsx.

23. Goodrum, Paul; Taylor, Timothy R. B.; Lester, William; McCoy, Alex; Uddin, Mohammed M.; and Shan, Yongwei, "Change Orders and Lessons Learned". Kentucky Transportation Center Research Report. 33. 2010.

24. Gransberg, D., Pittenger, D., and Chambers, G. NCHRP 20-07 Task 373: *Utility Coordination Using Alternative Contracting Methods*. November 2017.

25. Hammerschmidt, A, Ziolkowski, C., Huebler, J., Givens, M., and McCarty, J. Innovations to Locate Stacked or Deep Utilities. SHRP 2 Report S2-R01C-RW-1.Transportation Research Board of National Academies, Washington, D.C., 2015.

26. Kraus, E., *Managing Longitudinal Utility Installations on Controlled Access Highway Right-of-Way*. NCHRP Synthesis 462. Transportation Research Board of the National Academies, Washington, D.C., 2014.

27. New Jersey Department of Transportation. Utility Management (website). http://www.state.nj.us/transportation/capital/pd/process_utilitymgt.shtm. Online Access: July 28, 2017.

28. NHI, Utility Coordination for Highway Projects: Participant Workbook. National Highway Institute, Training Course FHWA-NHI-134006. Publication No. FHWA-NHI-11-060. November 2013. Training Course Attended, 2016.

29. NJDOT (New Jersey Department of Transportation). Utility Management (website). Accessed: July 28, 2017. http://www.state.nj.us/transportation/capital/pd/process_utilitymgt.shtm.

30. NVDOT (Nevada Department of Transportation). *Risk Management and Risk-Based Cost Estimation* Guidelines. August 2012.

31. *Program Guide: Utility Relocation and Accommodation on Federal-Aid Highway Projects*. 6th Edition. Office of Program Administration, FHWA, Washington, D.C., 2003.

32. Quiroga, C., Anspach, J., Scott, P., and Kraus, E. *Feasibility of Mapping and Marking Underground Utilities By State Highway Agencies*. Report FHWA-

HRT-16-019. Office of Research and Technology Services, FHWA, Washington, D.C., 2016.

33. Quiroga, C., Kraus, E., Le, J., Scott, P., Anspach, J., Swafford, T., and Meis, P. *Identification of Utility Conflicts and Solutions: Pilot Implementation of the SHRP 2 R15B Products at the Maryland State Highway Administration*. SHRP 2 Renewal Project R15C.Transportation Research Board of National Academies, Washington, D.C., 2015.
34. Quiroga, C., Kraus, E., Scott, P., Swafford, T., Meis, P., and Monday, G. *Identification of Utility Conflicts and Solutions*. SHRP2 Report S2-R15B-RW-1, Transportation Research Board of the National Academies, Washington, D.C., 2012.
35. Right-of-Way and Utilities Guidelines and Best Practices. Standing Committee on Highways, Strategic Plan, Strategy 4-4. American Association of State Highway and Transportation Officials, Washington, D.C., 2004.
36. Sinha, S., Thomas, H., Wang, M., and Jung, Y. *PennDOT Subsurface Utility Engineering Manual*. Pennsylvania Transportation Institute, Pennsylvania State University. August 20, 2007.
37. Sturgill, R., Taylor, T., and Li, Y. *Effective Utility Coordination: Application of Research and Current Practices*. NCHRP Synthesis 506. Transportation Research Board of National Academies, Washington, D.C., 2017.
38. Sturgill, R., Taylor, T., Ghorashinezhad, S., Zhang, J., *Methods to Expedite and Streamline Utility Relocations for Road Projects*. University of Kentucky,

Kentucky Transportation Center Report KTC-14-15/SPR460-13-1F. Lexington, Ky., December, 2014.

39. Taylor, T. and Maloney, W. *Forecasting Highway Construction Staffing Requirements*. NCHRP Synthesis 450. Transportation Research Board of National Academies, Washington, D.C., 2013.

40. The Ohio River Bridges Project. *Website accessed August 23,2017* http://kyinbridges.com/

41. Thorne, J., Turner, D., and Lindly, J. *Highway/Utility Guide*. Report FHWA-SA-93-049, Federal Highway Administration, Washington, D.C., 1993, 1-4, 17-44, 47-66 pp.

42. UESI (Utility Engineering and Surveying Institute), ASCE. Accessed: August, 2018. https://www.asce.org/utility-engineering-and-surveying/utility-engineering-and-surveying-institute/

43. USDOT TIFIA. *Website accessed August 23,2017* https://www.transportation.gov/tifia/financed-projects/ohio-river-bridges-east-end-crossing

44. Young, G. and Kennedy, C. Utility-Locating Technology Development Using Multisensor Platforms. SHRP 2 Report S2-R01B-RW-1.Transportation Research Board of National Academies, Washington, D.C., 2015.

VITA

Roy Everett Sturgill, Jr., P.E.

1. Educational Experience:

University of Kentucky– Lexington, Kentucky

Masters of Business Administration, August, 2003

Bachelor of Science in Civil Engineering, Minor: Mathematics, May 2003

Graduate Certificates: Applied Statistics

Anticipated Ph.D. in Civil Engineering, Fall 2018

Virginia Polytechnic Institute and State University

Master of Science in Engineering, Civil Engineering – Construction Engineering and Project Management, December 2004

Graduate Certificates: Engineering Education, Preparing the Future Professoriate

2. Professional Experience:

Research Engineer, October 2012-Present, Kentucky Transportation Center, University of Kentucky

Adjunct Instructor, January 2013-June 2013, Dept. of Civil Engineering, University of Kentucky

Adjunct Instructor, January 2012-2014, Civil Engineering Technology Program, Bluegrass Community and Technical College

Engineer, October 2012-October 2013, Division of Highway Design, Kentucky Transportation Cabinet

Engineer, January 2007-October 2012, Division of Construction, Kentucky Transportation Cabinet

Trainee, Summer 2003, 2001, 1999, District 12, Kentucky Transportation Cabinet

3. Honors:

Kentucky State Transportation Cabinet Scholarship

Academic Excellence Scholarship

National Alpha Lambda Delta

UK Alpha Lambda Delta

Chi Epsilon

Golden Key Honor Society

Nominated Outstanding Graduate Student

Nominated Outstanding Senior

Faculty Advisory Committee Masters Student Representative (Chair Appointed)

University Scholars Program

Carol Martin Gatton College of Business and Economics Scholarship

Omicron Delta Kappa

Pratt Fellowship

Tau Beta Pi

Vecellio Fellowship

School of Construction Outstanding Graduate Student

4. Professional Publications:

Newcomer, C., Withrow, J., Sturgill, R.E., and Dadi, G.B. (2018). "Towards an Automated Asphalt Paving Construction Inspection Operations." Proceedings from CIB W78-2018. Chicago, IL.

Al-Shabbani, Z., Sturgill, R.E., and Dadi, G.B. (2018). "Developing a Pre-Task Safety Briefing Tool for Kentucky Maintenance Personnel." 2018 Transportation Research Record. In press.

Wang, X., Sturgill, Jr., R.E., Al-Shabbani, Z., Kirk, A., and Dadi, G.B. (2017). "Estimating Earthwork Volume Calculations Using Unmanned Aerial Systems." Transportation Research Record. No. 2630, 2017 DOI: 10.3141/2630-01. 1-8.

Zhang, J., Taylor, T.R.B., Sturgill Jr., R.E., Dadi, G.B., and Stamatiadis, N. (2017). "Predictive Risk Modeling of Differential Bridge Settlement." Lean and Computing in Construction Congress. Heraklion, Crete, Greece. July 4-12, 2017.

Sturgill, Jr., R.E., Wang, X., and Dadi, G.B. (2017). "Mobile Information Technology Device Strategies, Uses, and Needs Across State Transportation Agencies." Proceedings

from the Transportation Research Board 96th Annual Meeting, Washington, D.C. January 8-12, 2017.

Zhang, J., Taylor, T.R.B., Sturgill, Jr., R.E., and Dadi, G.B. (2017). “Comprehensive Statistical Method for Predicting Differential Settlement at Bridge Ends.” Proceedings from the Transportation Research Board 96th Annual Meeting, Washington, D.C. January 8-12, 2017.

Wang, X., Sturgill, Jr., R.E., and Dadi, G.B. (2016). “Analyzing Use and Policies for Mobile Information Technology Devices within State Departments of Transportation”. Proceedings from the 2016 Construction Research Congress (CRC). San Juan, Puerto Rico

Sturgill, R., Taylor, T., and Li, Y. Effective Utility Coordination: Application of Research and Current Practices. National Cooperative Highway Research Program, Synthesis Report 506. ISBN 978-0-309-38993-6. 2017

Taylor, T., Sturgill, R., and Li, Y. Practices for Establishing Contract Completion Dates for Highway Project. National Cooperative Highway Research Program, Synthesis Report 502. ISBN 978-0-309-38984-6. 2017

Wang, X., Al-Shabbani, Z., Sturgill, R., Kirk, A., and Dadi, G. Estimating Earthwork Volumes Through Use of Unmanned Aerial Systems. Transportation Research Record: Journal of the Transportation Research Board. Volume 2630. 2017.

Li, Y., Taylor, T., Dadi, G. and Sturgill, R. Modeling Long-Term Highway Staffing Requirements for State Transportation Agencies. Transportation Research Record: Journal of the Transportation Research Board. Volume 2612. 2017.

Zhai, D., Shan, Y., Sturgill, R., Taylor, T., and Goodrum, P. Using Parametric Modeling to Estimate Highway Construction Contract Time. Transportation Research Record: Journal of the Transportation Research Board. Volume 2573. 2016

Dadi, G., Sturgill, R., and Wang, X. Uses of Mobile Information Technology Devices in the Field for Design, Construction, and Asset Management. National Cooperative Highway Research Program, Synthesis Report 491. ISBN 978-0-309-27212-4. 2016