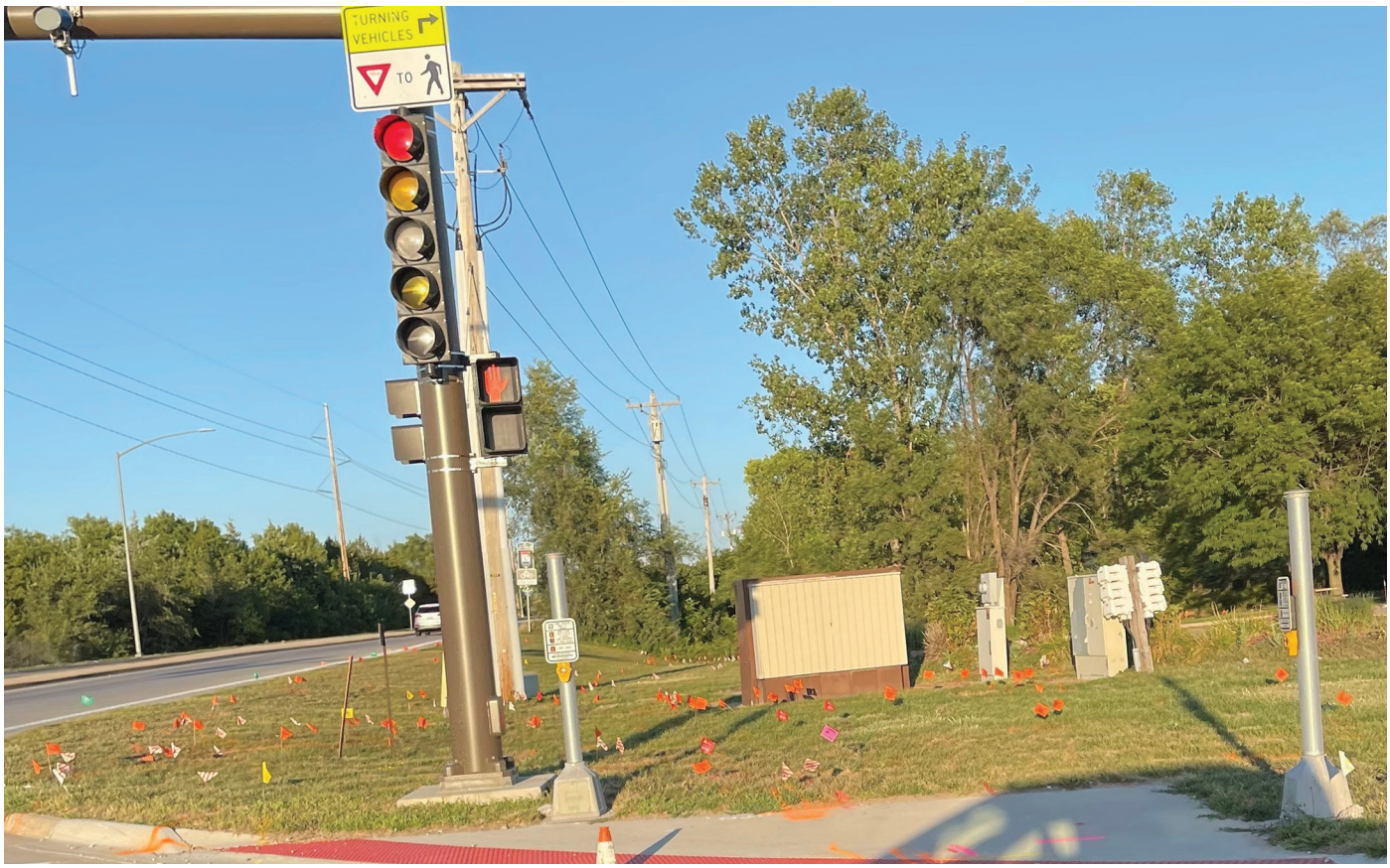
Best Practices for Utility Management in the Public Right of Way

Final Report
November 2025

CMAT
CONSTRUCTION MANAGEMENT AND TECHNOLOGY



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16. Abstract

As utility infrastructure increasingly occupies public roadway rights of way (ROWs), Iowa faces growing challenges in coordinating utility installations and managing space efficiently. The lack of standardized oversight across cities, counties, and the Iowa Department of Transportation (DOT) has led to inconsistent practices, disorganized utility placement, and costly delays in highway construction. This research aimed to develop a comprehensive utility management approach by identifying best practices for planning, documenting, and managing utility installations within public ROWs. Through surveys of current practices, gap analysis, and stakeholder engagement, the study produced a framework for improved utility coordination. Key recommendations include statewide standardization of policies, mandatory digital as-built documentation, designated utility corridors, enhanced permitting and oversight, and clear protocols for managing abandoned utilities. The research also resulted in the development of training programs and outreach efforts to support implementation. By adopting these strategies, Iowa can achieve more efficient, coordinated, and sustainable utility management, ultimately reducing project costs and preserving ROW integrity for future infrastructure needs.

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BEST PRACTICES FOR UTILITY MANAGEMENT IN THE PUBLIC RIGHT OF WAY

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EXECUTIVE SUMMARY

As utility companies seek to expand and enhance the services they provide, more utility infrastructure is being crowded into public roadway rights of way (ROWs). New facilities are often installed with minimal oversight and without consideration of other future utility space needs or, in some cases, future roadway needs. Within Iowa, ROW management for construction and utility activities varies between cities, counties, and the Iowa Department of Transportation (DOT). This variation has led to differing methodologies and unorganized coordination within public agencies on infrastructure projects containing utilities. There is a need for a broader utility management approach to control the planning and installation of utilities within the public ROW, require documentation of utility as-built plans and location information, and manage this information so that it can be useful to future construction efforts. Without such an approach, the accommodation of utility facilities will continue to be disorganized, inefficient, and the cause of increased costs and delays in the construction of highway projects.

To address these issues, the primary goal of this research was to develop a comprehensive utility management approach through the collection of best practices to help control the planning and installation of utilities within the public ROW, require documentation of utility as-built plans and location information, and manage this information for the benefit of future construction efforts. To achieve these objectives, the research team followed a systematic research approach, which included surveying current practices among city, county, and state agencies in Iowa; generating a framework for existing best practices; identifying shortcomings and gaps in current practices; providing solutions to address these issues; and developing a comprehensive document encompassing best practices for utility management in the ROW. Furthermore, the team developed in-person and online training courses, presented the research findings at various conferences, and organized an in-person training circuit to disseminate the results and recommendations to a wide audience of stakeholders.

The following list highlights several key findings and recommendations gathered from the study for utility management practices in Iowa:

- **Statewide standardization**: Implement consistent policies and practices across all state and local agencies, with the Iowa DOT taking a leadership role in developing uniform standards.
- **Digital as-built documentation**: Mandate statewide digital as-built documentation standards, such as geographic information system (GIS)-based utility mapping, to improve location accuracy and facilitate data sharing.
- **Utility corridor management**: Encourage the use of designated utility corridors to consolidate infrastructure, reduce congestion, and optimize ROW utilization.
- **Improved congestion management**: Develop streamlined coordination protocols for crowded highway utility zones to minimize delays and disruptions.
- **Robust permitting and oversight**: Strengthen enforcement of permitting and installation guidelines to ensure compliance and prevent improper utility installations.
- **Comprehensive restoration standards**: Establish rigorous procedures and warranty requirements for utility work on state highways to maintain infrastructure integrity and longevity.

- **Regulation of abandoned utilities**: Develop clear policies and procedures for managing the removal or abandonment of out-of-service utility infrastructure to minimize clutter and maintain accurate records.

By adopting these integrated strategies, Iowa can move toward a more efficient, coordinated, and sustainable approach to utility management, ultimately reducing project costs and delays, enhancing safety, and protecting vital ROW space for future infrastructure needs. Continued research into utility as-built guidance, standardized accommodation policies (e.g., through the Iowa Statewide Urban Design and Specifications [SUDAS] program), and permitting requirements will further support these efforts. The key inferences from this study underscore the need for the Iowa DOT to take a proactive approach in helping to address the identified challenges and deficiencies in utility management practices across Iowa. This proactive approach is already evident in the research put forward by the Iowa DOT, the host of policy and rule improvements being implemented, and the outreach efforts that have been initiated, such as the training provided by this project. By focusing on policy integration, geospatial data standards, congestion coordination, restoration accountability, and proactive infrastructure planning, the Iowa DOT can lead the way in promoting consistent, efficient, and sustainable utility management practices throughout the state.

CHAPTER 1. INTRODUCTION

1.1 Problem Statement

As utility companies seek to expand and enhance the services they provide, more utility infrastructure is being crowded into public roadway rights of way (ROWs). New facilities are often installed with minimal oversight and without consideration of other future utility space needs or, in some cases, future roadway needs. When new utility facilities are installed to replace existing infrastructure, the existing utility facilities are seldom removed and become abandoned or out of service, further congesting the public right of way. The reference to these left-behind utilities as abandoned or out of service can also lead to obscurity regarding their ownership. Additionally, the location of permitted utility installations is often left to the discretion of the utility company installers, as long as they comply with the general requirements of the state or local utility accommodation policies. These as-installed locations are also rarely captured to a measurable geospatial accuracy. To complicate this situation, utility permits and documentation requirements for utility installations vary considerably throughout the United States.

Within Iowa, ROW management for construction and utility activities varies between cities, counties, and the Iowa Department of Transportation (DOT). This variation has led to differing methodologies and unorganized coordination within public agencies on infrastructure projects containing utilities. There is a need for a broader utility management approach to control the planning and installation of utilities within the public ROW, require documentation of utility as-built plans and location information, and manage this information so that it can be useful to future construction efforts. Without such an approach, the accommodation of utility facilities will continue to be disorganized, inefficient, and the cause of increased costs and delays in the construction of highway projects.

1.2 Background Summary

The co-location of utilities and roadways emphasizes the need for resolute guidance on accommodating utility facilities in the public ROW. As the managers of this ROW, DOTs, municipalities, and local governments must understand the federal, state, and local rules and options for utility accommodation. New demands for ROW by renewable energy projects, various cellular technologies (which require fiber optic access), other telecommunications, and the needs that will arise for connected and autonomous vehicles are beginning to test the limits of ROW accommodation policies. At the same time, the expansion of more common utilities such as electric, water, gas, and sewer also requires accommodation.

Utility firms provide necessary services to the public. The installation of utilities along the ROW of public roads and streets is not only because of the low cost for accommodation, but also because these roads and streets follow their users. If utilities were not allowed to use the ROW, they would be required to purchase land themselves, driving up the overall cost to the utility organizations and, subsequently, the public. As a general rule, the Federal Highway Administration (FHWA) has noted that the use of highway ROW for accommodating utilities is

in the public interest. The history of this practice is well captured within National Cooperative Highway Research Program (NCHRP) Synthesis of Highway Practice 224 (Williams 1996).

Some approaches to managing utility accommodations have involved compensation (e.g., fees or resource sharing) for access. In the past, fees charged for utility accommodation were generally just to cover the cost of processing permits and other actual costs (fee neutral). With the advent of fiber optics and wireless telecommunications, ROW space is rapidly being expended, and opportunities exist for DOTs to look at more lucrative valuations of their ROW. The question of valuation and compensation for accommodating utilities in the public ROW is mired by federal, state, and local policy and regulations; the growing political nature of telecommunications infrastructure; and the various environmental (rural-urban classification, access control, etc.) scenarios surrounding accommodation cases.

Furthermore, as utility companies seek to expand and enhance their services, more utility infrastructure is being installed in the public ROW. However, new facilities are often installed with minimal oversight and consideration of future utility space needs. When new utility facilities replace existing infrastructure, the old utility lines are frequently abandoned in place rather than removed, further congesting the ROW. Utility permitting and documentation requirements also vary considerably across cities, counties, and the Iowa DOT. This lack of coordination has led to disorganized and inefficient utility accommodation practices.

A review of the literature reveals growing concerns among state agencies, contractors, and utility operators regarding ROW management and utility coordination. Poor management practices can lead to construction delays, design changes, safety hazards, and public inconvenience. In response, many state DOTs have developed utility accommodation policies and procedures to streamline installation, maintenance, and relocation processes. Key strategies include the following:

- Emphasizing coordination, cooperation, and communication (CCC) among stakeholders
- Establishing clear utility placement guidelines, installation methods, and adjustment processes
- Modernizing utility permitting systems through automation and integration with other data systems
- Improving utility location data quality through subsurface utility engineering (SUE) practices that adhere to ASCE 38-22
- Adopting ASCE 75 for recording and exchanging utility infrastructure data to facilitate efficient data management and sharing among stakeholders
- Designating utility corridors to consolidate infrastructure
- Defining procedures for removing abandoned facilities and changing utility status
- Setting pavement restoration standards and warranty periods for utility cuts

To assess current utility management practices in Iowa, a survey was conducted of city, county, and state agencies. The results reveal some accomplishments in establishing standard policies but also expose gaps and inconsistencies in key areas like permitting, as-built documentation,

installation oversight, corridor management, abandonment procedures, and restoration requirements. Over 90% of responding agencies lack formal processes for collecting as-built utility maps or for addressing abandoned infrastructure. Around half do not have clear utility placement and installation guidelines. Very few utilize proactive strategies like designated utility corridors.

In summary, while efforts have been made to improve utility coordination, significant problems persist that threaten the safety, efficiency, and sustainability of infrastructure. There is a clear need for a broader utility management approach to control utility installation, require as-built documentation, remove abandoned lines, and establish standards for critical procedures currently lacking in many jurisdictions. Without such an integrated framework, utility accommodation will continue to be disorganized, inefficient, and the cause of increased costs and delays. This research aims to address these challenges by synthesizing best practices into a comprehensive set of strategies to guide agencies in enhancing utility coordination and protecting vital ROW space for the future.

1.3 Study Objectives

The disorganized and inefficient accommodation of utility facilities within the public ROW often leads to increased costs and delays in construction projects. To address this issue, the primary goal of this research was to develop a comprehensive utility management approach through the collection of best practices to help control the planning and installation of utilities within the public ROW, require documentation of utility as-built plans and location information, and manage this information for the benefit of future construction efforts. The specific objectives of this study were twofold:

1. Document practices from across a range of agencies for project coordination and management of the ROW, including utility locating, permitting requirements, ordinances, installation methods, and capacity requirements that allow for future flexibility.
2. Undertake a series of technology transfer activities to showcase the main objective, including conference presentations, in-person training, and an online training course.

To achieve these objectives, the research team followed a systematic research approach, which included surveying current practices among city, county, and state agencies in Iowa; generating a framework for existing best practices; identifying shortcomings and gaps in current practices; providing solutions to address these issues; and developing a comprehensive document encompassing best practices for utility management in the ROW. Furthermore, the team developed in-person and online training courses, presented the research findings at various conferences, and organized an in-person training circuit to disseminate the results and recommendations to a wide audience of stakeholders.

By accomplishing these objectives, this study provided a valuable resource for public municipalities to better manage their ROW by enforcing proper installation and documentation of utilities. The proposed utility management approach is expected to streamline coordination efforts, reduce conflicts and delays, and ensure the efficient use of limited ROW space.

1.4 Coordination with Affiliated Concurrent Research Efforts

The Iowa DOT embarked on an extensive review and enhancement effort of its utility coordination program at the time of instituting this study. The Iowa DOT initiated three research studies simultaneously, including this study. The concurrent studies are listed in Table 1.

Table 1. Concurrent Iowa DOT utility-related research projects

Project Number	Title
SPR-RE22(011)-8H-00	Best Practices for Utility Management in the Public Right of Way
SPR-RE22(012)-8H-00	Project Development and Utility Coordination as a Partnership
SPR-RE22(013)-8H-00	Early Identification and Location of Utility Facilities within Iowa DOT Project Footprints

The coordination of these three projects involved an overlap of the research team members (i.e., Roy Sturgill and Jesse Cooper were members of all three research teams), an overlap of the technical advisory committee (TAC) members across the three projects, and partnerships among the research teams to coordinate research efforts and conduct focus group sessions that involved discussions and data gathering for all three projects. While there was a coordination effort among these projects, each project had its own distinct goals and objectives that were achieved through its completion.

CHAPTER 2. LITERATURE REVIEW

This chapter summarizes and identifies various studies on utility management practices. These include studies on utility project coordination and right of way management, such as utility locating, permitting requirements, ordinances, installation methods, and capacity requirements. Furthermore, this section reviews relevant state, local, national, and international resources and guidance documents.

2.1 DOT Right of Way and Utilities

DOT ROW is a critical component of highway infrastructure, encompassing the land area that a roadway or highway occupies (FHWA 2017). This land is either owned by the government agency responsible for the transportation facility or is legally permitted for use in the construction, operation, and maintenance of transportation-related projects (FHWA 2017). To minimize land acquisition costs and streamline infrastructure development, utility networks and facilities often share the ROW with transportation infrastructure (FHWA 2017, Hemstock 2008, Sahle and Aregawi 2021).

As the demand for utility services has grown, the presence of utility infrastructure within the ROW has increased significantly. This has led to a greater need for effective ROW management practices and coordination between transportation agencies and utility companies (Iowa DOT 2012, Montes Victorio et al. 2021, Nemeth 2019, Sahle and Aregawi 2021). Proper ROW management is essential to ensure the safety, efficiency, and sustainability of both transportation and utility infrastructure.

However, the co-location of utilities within the ROW presents several challenges. Hemstock (2008) highlights growing concerns among state agencies, contractors, and utility operators regarding the management of utilities within the ROW. Poor ROW management and a lack of utility coordination can lead to construction project delays, conflicts, and inconveniences for the public (Hemstock 2008, Sahle and Aregawi 2021). These issues can result in increased costs, extended project timelines, and potential safety hazards.

To address these challenges, state DOTs and utility companies have recognized the importance of developing comprehensive utility accommodation policies and procedures (FHWA 2002, Hemstock 2008, INDOT 2021, KDOT 2020, MaineDOT 2020, MnDOT 2016, Nemeth et al. 2020). These policies aim to streamline utility installation, maintenance, and relocation processes while ensuring the safety and integrity of transportation infrastructure. By establishing clear guidelines and fostering collaboration between stakeholders, effective ROW management practices can minimize conflicts, reduce project delays, and promote the efficient use of limited ROW space.

In summary, the co-location of utilities within the DOT ROW presents both opportunities and challenges. As utility infrastructure continues to expand, the development and implementation of robust ROW management practices and utility coordination strategies is becoming increasingly

critical. By addressing these issues proactively, state DOTs and utility companies can work together to ensure the safe, efficient, and sustainable use of the ROW for the benefit of all stakeholders.

2.2 The Problem of Utility Management along the ROW

The expansion of utility facilities along the ROW has become increasingly prominent in recent years. However, poor management of these utilities has led to numerous problems, including construction project delays, recurring disruptions to roadway designs after construction completion, and interference with utility services (Sahle and Aregawi 2021). In their review of a study titled "Utility Owners' Pre-Construction and Construction Responsibilities" by the Georgia Department of Transportation (GDOT), Sahle and Aregawi (2021) stated that ineffective utility management contributes to 43% of construction project delays in the United States, highlighting the significant impact of this issue on transportation infrastructure projects.

One of the primary factors contributing to utility-related delays in highway construction is the lack of accurate and comprehensive information on the location of utility facilities. A study conducted by Ellis and Thomas (2003) found unidentified and inaccurately located utilities to be the leading cause of delays, based on surveys of state highway agencies and contractors. This finding is supported by several other studies, which emphasize the importance of precise and comprehensive utility data in preventing conflicts with construction projects (Bell et al. 2014, Ellis and Thomas 2003, Sahle and Aregawi 2021).

In addition to the lack of accurate utility data, insufficient coordination and communication among stakeholders have been identified as significant barriers to resolving utility issues effectively (Kraus et al. 2013, Kraus et al. 2015, Victorio et al. 2021). When stakeholders, such as state agencies, utility companies, and contractors, fail to collaborate and share information effectively, it becomes challenging to address and manage utility conflicts proactively. This lack of coordination can lead to delays, increased costs, and potential safety risks.

Recognizing the need for improved utility management practices, state agencies and utility companies are developing more practical and effective approaches to better manage utilities within the ROW (Nemeth 2019, Sahle and Aregawi 2021, Taylor et al. 2021). These efforts aim to minimize project delays, conflicts, potential safety risks, traffic congestion, and added inconvenience and expenses to the public.

Effective utility management along the ROW requires a multifaceted approach that addresses the root causes of utility-related issues. This includes, but is not limited to, the following:

1. Improving the accuracy and comprehensiveness of utility data through the use of advanced mapping and locating technologies (Anspach 2010, Anspach and Scott 2019, Esekhaigbe et al. 2020, Quiroga et al. 2018, Sterling et al. 2009)

2. Enhancing coordination and communication among stakeholders by establishing clear protocols and utilizing collaborative tools and platforms (FHWA 2018, Marti et al. 2002, Quiroga et al. 2012, Taylor et al. 2021)
3. Developing and implementing comprehensive utility accommodation policies that provide guidance on utility installation, maintenance, and the relocation process (Bell et al. 2014, Chou et al. 2009, Marti et al. 2002, Minnehaha County Highway Department 2021, Nemeth 2019, Nemeth et al. 2020, Sahle 2019, TAC and Public Utilities Management Subcommittee 2016)
4. Investing in training and education programs to improve the skills and knowledge of personnel involved in utility management and coordination (Lew and Anspach 2010, Taylor et al. 2021)

By addressing these key areas, state agencies and utility companies can work together to create a more efficient, safe, and cost-effective approach to utility management along the ROW. This, in turn, will help to minimize the negative impacts of utility-related issues on transportation infrastructure projects and the public.

2.3 Utility Management Practice along Right of Way

The co-location of highways and utility facilities underscores the need for clear and comprehensive guidelines on accommodating utility infrastructure within the public ROW (Ellis et al. 2009). ROWs are typically managed by DOTs, municipalities, or local governments (FHWA 2017). As such, these entities are responsible for understanding and adhering to federal, state, and local requirements, as well as evaluating the available options for accommodating utilities. Extensive research and guidance have been developed at the national, state, and local levels to assist in utility management practices, including utility locating, permitting, ordinances, installation methods, and capacity requirements along the ROW, to ensure future flexibility and sustainability (Ellis et al. 2009, Hemstock 2008, Kraus et al. 2013, Nemeth 2019, Sahle and Aregawi 2021).

2.4 Utility Coordination

Utility coordination is a critical component of effective utility management along the ROW. The CCC management strategy, which has its roots in supply chain management and inter-organizational relationships from the late 1980s and early 1990s (Bowersox et al. 1986), has been recognized as an effective tool for ensuring successful collaboration among stakeholders in various fields, including utility-related projects. The CCC strategy aims to minimize project delays, conflicts, risks, and additional expenses associated with project development (Victorio and Sturgill 2024, Taylor et al. 2021). In the context of utility coordination, various studies have emphasized the importance of the CCC management strategy (INDOT 2021, Victorio et al. 2021, Sahle and Aregawi 2021, Taylor et al. 2021, UDOT 2017, WisDOT 2021). Sahle and Aregawi (2021), for example, describe utility coordination as an effective tool that can minimize project delays, conflicts, risks, and additional expenses associated with utility-related project development. Recognizing the benefits of this approach, many state DOTs have adopted the

CCC management strategy, leading to improved utility management practices (INDOT 2021, MDOT 2020, UDOT 2017, WisDOT 2021).

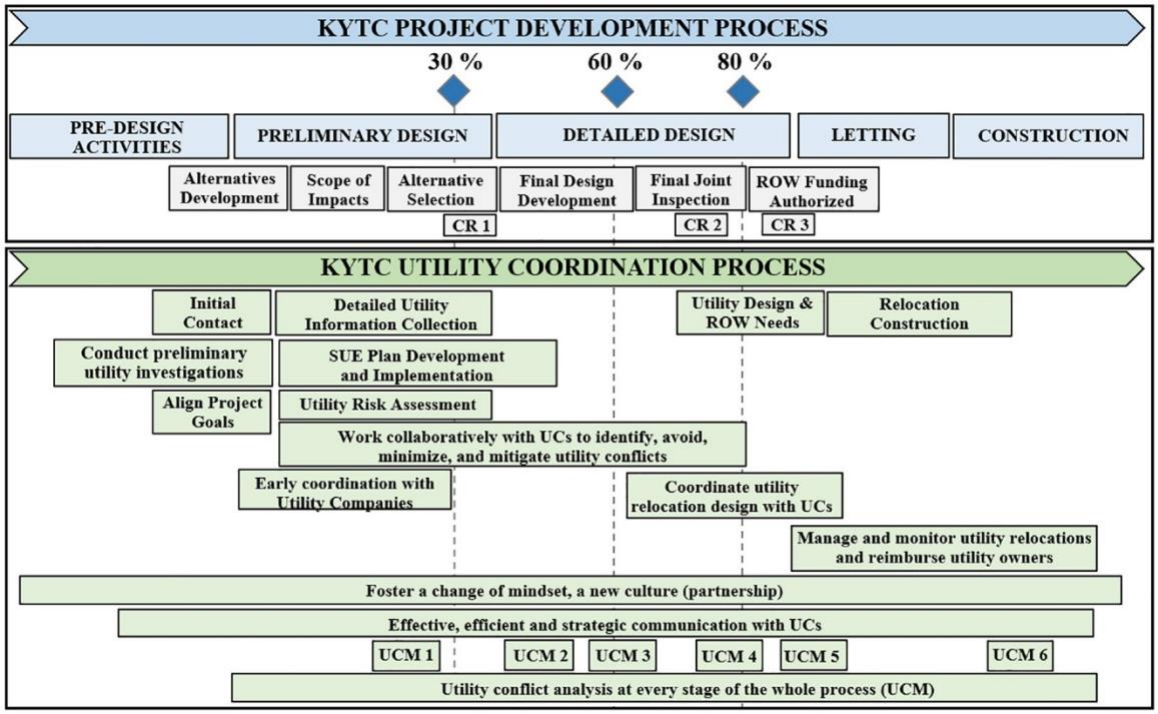
The effectiveness of the CCC management strategy in reducing the time and costs associated with utility relocations has been demonstrated through various studies. A joint research effort by the NCHRP and the state of Indiana explored methods to optimize utility relocation processes. The study found that integrating the CCC management strategy could result in more efficient and cost-effective utility relocations (INDOT 2004, Reinke 2010, Scott 2012). Similarly, a study conducted by the Minnesota Local Road Research Board investigated ways to streamline utility relocations at both the county and city levels. The researchers concluded that focusing on communication and coordination was essential for reducing the time required for utility relocations in future projects (Marti et al. 2002).

To further enhance the benefits of the CCC management strategy, it is crucial to implement it proactively and consistently throughout the entire project life cycle. By doing so, project teams can more effectively identify and resolve utility-related issues within the ROW, minimize unnecessary utility relocations, reduce unanticipated costs, and ensure that utility relocations are completed on schedule (Victorio et al. 2021, Victorio et al. 2023).

In addition to the CCC management strategy, other best practices for utility coordination, proposed by Victorio et al. (2023), include the following:

1. Early involvement of utility companies during the design process to identify utility conflicts and collaborate on solutions (Omer et al. 2022, Taylor et al. 2021). This allows for proactive identification and mitigation of utility-related project risks.
2. Aligning project goals between the transportation agency and utility companies to create a common vision and facilitate better decision-making (Victorio et al. 2023).
3. Developing a utility communication and engagement management plan to ensure effective and efficient communication throughout the project (Taylor et al. 2021, Victorio et al. 2023).
4. Strategic use of SUE to collect accurate utility data early in the design process, using guidance based on project type and location (Sturgill et al. 2022, Victorio et al. 2023).
5. Implementing utility conflict matrices (UCMs) as a best practice for systematically identifying, assessing, and tracking utility conflicts (Kraus et al. 2015, Sturgill 2023).
6. Conducting constructability reviews at different stages of the design process to identify and address utility-related concerns and potential issues (Victorio et al. 2023).

In their study, Victorio et al. (2023) further proposed an approach for integrating utility coordination practices into the Kentucky Transportation Cabinet (KYTC) project development process (Figure 1). This approach emphasizes early involvement of utility companies, strategic use of SUE, utility conflict management, and constructability reviews at various stages of the project life cycle to enhance the alignment of utility coordination and highway design processes (Victorio et al. 2023).



Note: ROW = right of way, SUE = subsurface utility engineering, UCs = utility companies, UCM = utility conflict management

Figure 1. Proposed approach for the KYTC highway design and utility coordination alignment

By adopting these best practices and consistently applying the CCC management strategy, state DOTs, municipalities, and local governments can significantly improve utility coordination and management along the ROW, resulting in more efficient, cost-effective, and sustainable infrastructure projects.

2.5 Utility Permitting and Requirements

Utility installation within the ROW requires permits to ensure compliance with regulations and requirements for effective utility management (Xu et al. 2020). The permitting process has traditionally been straightforward, involving the completion of a request form that provides the location and type of utility to be installed along the ROW. Across all state agencies in the United States, thousands of permits are filed and processed each year (Lee et al. 2016).

In the past, state agencies relied on paper-based utility permitting procedures, which often resulted in delays in permit reviews and processing (Collier and Kranc 2006). This era was characterized by permit issuance backlogs, ineffective tracking, and undefined requirement procedures and compliance checking. However, with the advent of automation, utility permitting procedures have transitioned from paper-based systems to automated approaches, streamlining utility processing (Quiroga and Pina 2004).

Quiroga and Pina (2004) examined an internet-based permitting system implemented by the City of San Antonio, which integrated the city's geographic information system (GIS). This system enabled online permit activity, reducing permit application time by 70% within the first three months of implementation. Following this success, several state agencies, including the Georgia, Texas, Utah, Minnesota, Nebraska, and Oregon Departments of Transportation, have developed automated systems that provide interactive online utility permit data entry for review, integrated with other utility systems and ROW-related workflows (Quiroga and Pina 2004).

Over the years, further advancements in automation processes for utility permits have been made to reduce the time and paperwork required for permit processing. These advancements also provide transportation agencies with a means to maintain an up-to-date inventory of utilities by leveraging the information gathered during the permitting process (Quiroga et al. 2014a, Quiroga et al. 2014b, Xu et al. 2020).

Xu et al. (2020) developed an innovative system to further advance utility permitting practices through integration and automation. Their study introduced a new utility permitting approach based on an object-oriented utility data model in Unified Modeling Language (UML) and its associated constraints in Object Constraint Language (OCL). The UML defines the required information during the utility permitting process, while the OCL captures regulatory requirements governing the installation of utilities within the ROW. The OCL is constructed by employing a natural language processing (NLP) algorithm, which extracts utility accommodation requirements from state agencies' textual regulatory and policy documents.

Sturgill (2023) provided insights into the Iowa DOT's utility permitting process and recommendations for improvement. The research team found that the Iowa DOT's permitting process functions as required, but there are areas for improvement through developing and defining workflows. The workflow definition process should include pre-submission (information needed by utility companies as they prepare to submit an application), submission, review, decision points, inspection, and closeout. The workflow analysis should also include defining and standardizing the type of permit required (new installation, maintenance, project-related, etc.) and identifying decision points where subject matter expert input or review is required (Sturgill 2023).

The application process for the Iowa DOT includes a checklist specifying the information required for the submission of detailed drawings and specifications that accompany the permit application. Sturgill (2023) recommended that the Iowa DOT create an interface or service that consolidates this information into a map and services where applicants could capture the required information and download certain data for use in developing their detailed installation plans. The research team also suggested that the Iowa DOT review other data layers that may be helpful for applicants and reviewers, such as planned project data, to identify possible opportunities for improved collaboration or to determine if the proposed installation would impact an ongoing or planned roadway project (Sturgill 2023).

Sturgill (2023) also recommended that the Iowa DOT pursue a cloud-based commercial off-the-shelf (COTS) system for electronic permitting. COTS products are designed to be installed easily

and configured to interface with existing systems, offering benefits such as lower costs, reduced development time, faster integration of new technologies, and readily available and up-to-date products. The research team provided a feature functionality matrix as a starting point to identify potential features required by the Iowa DOT (Sturgill 2023).

The newly developed systems and recommendations have demonstrated several benefits (Quiroga et al. 2014b, Quiroga and Pina 2004, Sturgill 2023, Xu et al. 2020):

1. Expediting the permitting process by automating data entry and compliance checking
2. Assisting in the early identification of utility conflicts during the design stage, allowing for the development of alternative options to resolve these conflicts
3. Improving the accuracy and consistency of utility permit data by enforcing standardized data models and constraints
4. Enhancing the efficiency and effectiveness of utility management along the ROW by integrating permit data with other utility and ROW management systems

As utility permitting systems continue to evolve, the integration of advanced technologies such as machine learning, computer vision, and GIS will further enhance the automation and accuracy of the permitting process (Quiroga and Pina 2004, Xu et al. 2020). By adopting these cutting-edge permitting systems and best practices, state agencies and local governments can significantly improve utility management along the ROW, reducing conflicts, delays, and costs associated with utility installations and relocations.

2.6 Utility Installation Methods

Utility installation methods encompass the processes and technologies employed to install utility infrastructure along the ROW (Najafi 2010). These methods are implemented by state agencies or utility companies to place utilities within the ROW. In many states, state agencies are required to be involved in the utility installation process along the ROW, which includes assessing the feasibility and appropriateness of various trenchless technologies and methods for specific utility installations (Najafi 2010). State agencies may either issue permits to utility companies to carry out the installation or directly participate in the process. The active engagement of state agencies contributes to the effective management and oversight of the installation procedure (Iseley and Gokhale 1997, TAC 2013, Thomson and Rumsey 1997).

Historically, the open-trench method was the primary means of installing underground utility facilities, such as pipes and conduits of various sizes, within the ROW (Iseley 1997). However, with the advent of automation in the construction industry, trenchless technology has gained prominence as an alternative approach (Thomson and Rumsey 1997). Trenchless technology encompasses a wide range of methods and techniques, each with its own set of capabilities and limitations for utility installation. These technologies offer various advantages over traditional open-cut methods, such as minimizing surface disruption, reducing environmental impact, and expediting project completion (Kaushal et al. 2020, Kramera et al. 2018, Najafi 2010).

The selection of the appropriate installation method, whether open excavation or trenchless technology, requires careful consideration of several factors, including the type of utility being installed, soil conditions, depth of installation, and available space within the ROW (Abraham et al. 2007, Kramera et al. 2018, Monfared 2018). Open excavation and trenchless technologies demand different tools, skills, and expertise for the successful installation of conduits beneath highways. Therefore, it is crucial to employ the appropriate tools and procedures and ensure that the operator and crew possess the necessary skills and knowledge to execute the job effectively. This involves making informed decisions about how local governments, state transportation agencies, and utility companies can leverage trenchless technology in projects that require conduit installation (Abraham et al. 2007)

Abraham et al. (2007) highlighted various issues related to the use of trenchless technology and procedures for utility installation. Their study identified a lack of specification and assessment tools for determining the most effective trenchless procedures based on project requirements, as well as a lack of experience, skills, and tools among state agency engineers. To address these challenges, their research contributed to the development of a decision support system that aids in the selection and execution of trenchless ROW installation technologies (Abraham et al. 2007).

Despite the advantages offered by trenchless technologies, their successful implementation requires a thorough understanding of their capabilities, limitations, and suitability for specific project conditions. State agencies and utility companies must collaborate to ensure that the chosen installation methods align with project requirements, minimize disruption to the public, and comply with relevant regulations and standards (Abraham et al. 2007, Ariaratnam et al. 2013).

As utility installation methods continue to evolve, the integration of advanced technologies, such as robotics, 3D modeling, and geospatial data analysis, will further enhance the efficiency, accuracy, and safety of utility installation processes (Esekhaigbe et al. 2020, Meis et al. 2020). By adopting best practices and leveraging innovative technologies, state agencies and utility companies can optimize utility installation along the ROW, reducing costs, minimizing conflicts, and ensuring the long-term sustainability of utility infrastructure.

2.7 Utility Investigation (Locating and Designating)

Utility investigation is a crucial component of effective utility management along the ROW. It involves the process of identifying, locating, and documenting existing subsurface utilities to support informed decision-making during project planning, design, and construction (Anspach and Scott 2019). Early methods for locating utilities involved using the One-Call procedure (Sturgill et al. 2018). In 1964, a clearinghouse was the starting point behind establishing the first location call centers, which preceded the establishment of One-Call (Thorne et al. 1993). The purpose of One-Call was to reduce damage to utilities by assigning statutory obligations during construction. However, reviews and investigations by agencies such as the Pipeline and Hazardous Material Safety Administration (PHMSA) and the NCHRP called for the improvement of the One-Call procedure due to the increase in underground utilities within the

ROW and the need for better coordination between aboveground and subsurface utilities (Sturgill et al. 2018).

Despite the implementation of One-Call systems, studies have shown that they alone have not eliminated key challenges related to unreliable utility data (Al-Bayati et al. 2022, Lew 2000, Quiroga et al. 2018, Sterling et al. 2009, Sturgill et al. 2018). A significant concern is that many utilities remain completely undocumented and unregistered in One-Call records. Even when utilities are registered, the location information provided is often inaccurate by several feet (Bernold 2003, Jung 2012, Stevens 1993). These inaccuracies can lead to preventable utility strikes and substantial project impacts, highlighting the need for continued enhancements to improve upon One-Call systems (Al-Bayati et al. 2022, Al-Bayati and Panzer 2019, Culp et al. 2003).

To address these challenges, the SUE technique was developed to achieve more effective utility management practices (Anspach 2010, Anspach and Scott 2019, FHWA 2018). SUE emerged as an engineering discipline in the 1980s, contributing to the reduction of underground utility accidents, damage, claims, and construction delays (Anspach 2010, Stevens and Anspach 1993). SUE is used throughout a project's design and planning stages to identify utilities and share location information with project stakeholders, enabling effective design decisions and the prevention of utility conflicts and disturbances (Anspach 2010).

The use of SUE has been widely adopted by state DOTs to locate utilities, leading to better coordination and management of utility-related projects (Sturgill et al. 2022). The SUE procedure for locating utilities is based on distinguishing different levels of utility data quality, which have been standardized in ASCE 38-22, Standard Guideline for Investigating and Documenting Existing Utilities (ASCE 38 2022). ASCE 38-22 defines four quality levels (QLD to QLA) for utility data based on how the data are collected and documented (Figure 2), each quality level with increasing levels of accuracy and reliability (Anspach and Scott 2019, ASCE 38 2022, Sturgill et al. 2022):

- **Quality Level D (QLD):** Information derived from existing records or oral recollections. Suitable for project planning and route selection but lacks the precision required for final design.
- **Quality Level C (QLC):** Information obtained by surveying visible utility features and correlating data with existing utility records. Suitable for initial engineering and design phases.
- **Quality Level B (QLB):** Information obtained by employing appropriate surface geophysical methods to determine the existence and approximate horizontal position of utilities within project limits. Suitable for final design but requires test holes for detailed elevation and attribute data.
- **Quality Level A (QLA):** Information derived from the precise horizontal and vertical location of utilities obtained by the actual exposure and subsequent measurement of subsurface utilities, usually at a specific point. Provides the highest level of accuracy but can be costly depending on the number of test holes.

Figure 2. Summary of SUE quality levels

Compliance with ASCE 38-22 improves the quality of utility mapping, reduces risks associated with inaccurate records, and helps prevent project delays, disruptions, damage, and redesigns (Anspach and Scott 2019, ASCE 38 2022, Noone 2004). The standard emphasizes the use of professional judgment to determine the appropriate sequencing and extent of investigations to mitigate risks effectively (Anspach and Scott 2019, ASCE 38 2022).

A comparative study by Adebiyi et al. (2024) investigated the accuracy of utility records obtained from traditional One-Call systems and SUE investigations conducted according to ASCE 38-22. The study developed a linear foot metric to quantify discrepancies and assess missing utility records. The findings revealed significant disparities in utility linear footage between the two methods, with SUE investigations consistently identifying a larger extent of utilities. This underscores the necessity of incorporating SUE practices early in the project development stages to ensure accurate utility data.

Studies have shown that the successful implementation of the SUE concept in identifying utilities has aided in resolving utility investigation issues for project development (Adebiyi et al. 2023, Adebiyi et al. 2024, Kraus et al. 2013, Lockhart 2004, Sturgill et al. 2022). Furthermore, more DOTs have adopted SUE in enhancing utility information early in the project delivery process compared to One-Call procedures (Sturgill et al. 2022).

In summary, utility investigation, particularly through the use of SUE and adherence to ASCE 38-22, is essential for effective utility management along the ROW. By providing accurate and reliable utility location data, SUE enables better decision-making, reduces project risks, and improves overall project outcomes. The incorporation of SUE practices early in the project

development process is crucial for mitigating utility-related conflicts and ensuring the efficient and safe execution of construction projects.

2.8 Various Agencies' Guidelines and Policies for Utility Management

Effective utility management along the ROW requires comprehensive policies and guidelines for the installation, maintenance, relocation, and coordination of utilities. To ensure a standardized approach, various state and federal agencies have developed uniform standards and guidelines addressing utility locating, permitting, requirements, ordinances, installation methods, capacity requirements, and the critical aspects of CCC among stakeholders (Sahle and Aregawi 2021). Table 2 provides a summary of the guidelines and policies developed by various agencies for managing utilities along the ROW.

Table 2. Summary of cities', states', and federal agencies' guidelines and policies for utility management

Guidelines and Policies for Utilities along the ROW	City, State, and Federal Sources
CCC of utilities along the ROW	CDOT 2021, FHWA 2002, INDOT 2021, MaineDOT 2020, NDDOT 2010, ODOT 2022, TAC 2008, TAC and Public Utilities Management Subcommittee 2016, UDOT 2017, WisDOT 2008, WisDOT 2021
Accommodation, Installation, and Capacity Requirement of utilities along the ROW	AZDOT 2015, City of Orlando 2016, IOWADOT 2012, KDOT 2020, Minnehaha County Highway Department 2021, MnDOT 2016, NDDOT 2020, NDOR 2001, NH-DOT 2017, NJUG 2013, TAC 2013, WSDOT 2016
Relocation of Utilities	CDOT 2021, FHWA 2002, MDOT 2018, NDDOT 2010, ODOT 2022, PDOT 2019, TDOT 2012, VDOT 2016, WSDOT 2008, WVDOH 2007

The CCC framework is a cornerstone of successful utility management, emphasizing the importance of long-term planning, collaboration with utility owners, regular meetings throughout the project life cycle, and an understanding of the complexities of utility relocation (FHWA 2002, INDOT 2021, TAC 2008). CCC guidelines provide a roadmap for effective coordination among project stakeholders, including utility owners, designers, and utility coordinators (TAC and Public Utilities Management Subcommittee 2016, UDOT 2017). By fostering open communication and collaboration, CCC guidelines help identify and resolve potential conflicts related to project schedules, constructability, and stakeholder relationships (CDOT 2021, WisDOT 2021).

Guidelines for accommodating and installing utilities along the ROW provide detailed instructions on the placement and installation of overhead and subsurface utilities, such as telecommunication lines, underground pipes, and overhead electric power lines (AZDOT 2015,

City of Orlando 2016, Iowa DOT 2012). These guidelines cover crucial aspects, including utility permitting procedures, design standards, installation methods, adjustment processes, responsibilities of involved parties, and safety considerations (KDOT 2020, MnDOT 2016, NDDOT 2020). For instance, the Transportation Association of Canada (TAC 2013) provides guidelines on worker safety during utility installations, while the National Joint Utilities Group (NJUG 2013) outlines best practices for positioning and color-coding underground utilities to facilitate identification and minimize conflicts.

Utility relocation is another critical aspect of utility management, requiring meticulous planning and coordination to ensure the timely and efficient removal and reinstallation of utilities (CDOT 2021, FHWA 2002, ODOT 2022). DOTs and other authorities publish relocation guidelines and recommendations that outline legal requirements, construction standards, safety protocols, and quality control measures (PDOT 2019, TDOT 2012, VDOT 2016). These guidelines aim to minimize traffic disruptions, service interruptions, damage to utility facilities, and public safety risks during the relocation process (MDOT 2018, WSDOT 2008). Sahle and Aregawi (2021) summarized the key components of relocation guidelines, which include the following:

1. Procedures for initiating the project and obtaining necessary permits for utility relocation
2. Roles and responsibilities of all parties involved
3. Strategies for minimizing utility conflicts throughout the design process
4. Strategies for coordinating utility adjustment work as early as possible
5. Procedures for utility cost estimation, planning, construction, and relocation
6. Inspection and quality control/quality assurance processes
7. Relocation procedures, including excavation techniques and damage prevention measures

In addition to the guidelines mentioned above, several agencies have developed comprehensive utility accommodation policies that provide a framework for managing utilities within the ROW. For example, the FHWA has published the “Utility Accommodation Policy” (UAP), which serves as a guide for state DOTs in developing their own policies (FHWA 2017). The UAP covers various aspects of utility accommodation, including the design, location, installation, adjustment, maintenance, and relocation of utilities within the ROW.

Similarly, state DOTs have developed their own utility accommodation policies tailored to their specific needs and requirements. For instance, the Iowa DOT has published the “Policy for Accommodating Utilities on the County and City Non-Primary Federal-Aid Road System” (Iowa DOT 2012), which outlines the procedures and requirements for managing utilities on non-primary federal-aid roads within the state. The policy covers topics such as utility permits, design standards, construction methods, and coordination with local agencies.

The development and implementation of these guidelines and policies demonstrate the commitment of various agencies to promoting a consistent and efficient approach to utility management along the ROW. By adhering to these standards, project stakeholders can minimize conflicts, reduce project delays, and ensure the safe and reliable operation of utility infrastructure.

In summary, the guidelines and policies developed by various agencies play a crucial role in streamlining utility management practices along the ROW. The CCC framework, accommodation and installation guidelines, relocation procedures, and comprehensive utility accommodation policies work together to foster effective coordination, minimize conflicts, and ensure the successful execution of utility-related projects. As the demand for utility infrastructure continues to grow, the continued development and refinement of these guidelines will be essential for the efficient management of utilities within the ROW.

CHAPTER 3. STATE AGENCIES SURVEY

Following a review of relevant literature, it was necessary to collect practices for review at the local level. To gain a comprehensive understanding of current utility management practices and challenges faced by various agencies in Iowa, a statewide survey was conducted as part of this research. The survey aimed to collect data on the existing policies, procedures, and experiences related to utility accommodation, coordination, and documentation within the public ROW. By gathering insights from city, county, and state agencies across Iowa, the survey sought to identify common issues, best practices, and potential gaps in utility management strategies. The results of this survey served as a foundation for developing a framework of best practices and recommendations to enhance utility coordination and ROW management in the state.

3.1 Methodology

The survey was conducted using the Qualtrics online survey platform to gather information on current policies and practices for utility management in public rights of way across various state and local agencies in Iowa. The survey examined several core aspects of utility management, including the following:

- Utilities considered by agencies
- Standard accommodation policies
- Permitting requirements
- As-built documentation procedures
- Utility location data specifications
- Installation guidelines
- Utility corridor planning
- Removal and abandonment protocols
- Pavement restoration standards

The survey was distributed to city, county, and state transportation agencies in Iowa. A total of 53 responses were received, representing a strong response rate. Participants were not required to answer every question if not applicable to their jurisdiction. Therefore, some questions have fewer than 53 responses reported in the results.

This chapter presents the results from the survey questions, organized by the main topic sections. The number of respondents for each question is reported, along with charts included to visualize the data. A discussion of the key findings and implications is provided for each topic area. The results provide insight into the current utility management policies and practices among Iowa agencies, as well as similarities and differences between jurisdictions. The findings highlight accomplishments in regulation and documentation while also exposing potential gaps that could be addressed to improve coordination, documentation, infrastructure longevity, and public satisfaction. Each section concludes with a listing of applicable recommendations to overcome the gaps identified. These recommendations are assembled from the literature review, survey feedback, and discussions with subject matter experts. The recommendations are restated in the

recommendations chapter of the report but are matched in this chapter to the appropriate identified gaps.

Overall, the survey provides a comprehensive assessment of the utility management landscape across multiple state and local agencies in Iowa. The results supply baseline knowledge on the current state of policies, procedures, and data management related to utilities in public rights of way. This information can help guide decisions and strategies for improving utility coordination and management going forward.

3.2 Summary of the Survey

A total of 53 responses were received from city, county, and state agencies, providing a comprehensive overview of the existing policies, procedures, and experiences related to utility accommodation, coordination, and documentation within the public ROW. The survey results shed light on the similarities and differences in utility management approaches across jurisdictions, highlighting areas of success as well as potential gaps and inconsistencies. The findings are organized into several key themes, including the types of utilities considered by agencies, standard accommodation policies, permitting requirements, as-built documentation practices, utility location data specifications, installation guidelines, utility corridor planning, removal and abandonment protocols, and pavement restoration standards. The analysis of these results forms the basis for identifying best practices and developing recommendations to improve utility coordination and ROW management in Iowa.

3.3 Utilities Considered by Agencies

Defining a set of infrastructure as a utility brings with it the application of utility-related policies, such as a utility accommodation policy, when determining permitting or other interactions with that set of infrastructure. Survey respondents were asked to select which utilities are considered utilities by their agency from a list. The most common options selected as utilities were water (15.55%), sanitary sewer (14.63%), gas distribution (12.80%), telecommunications/fiber, and electric (13.72%). The least commonly selected utilities were irrigation lines (6.40%), petroleum (8.54%), and oil and gas (transmission) (10.37%), as seen in Figure 3. When allowed to specify other utilities, the most frequent response was storm sewer, which was mentioned by nine respondents. This indicates that storm sewer is a common utility, even though it was not a predefined option in the survey. Drainage tiles and manure transfer lines were each mentioned once.

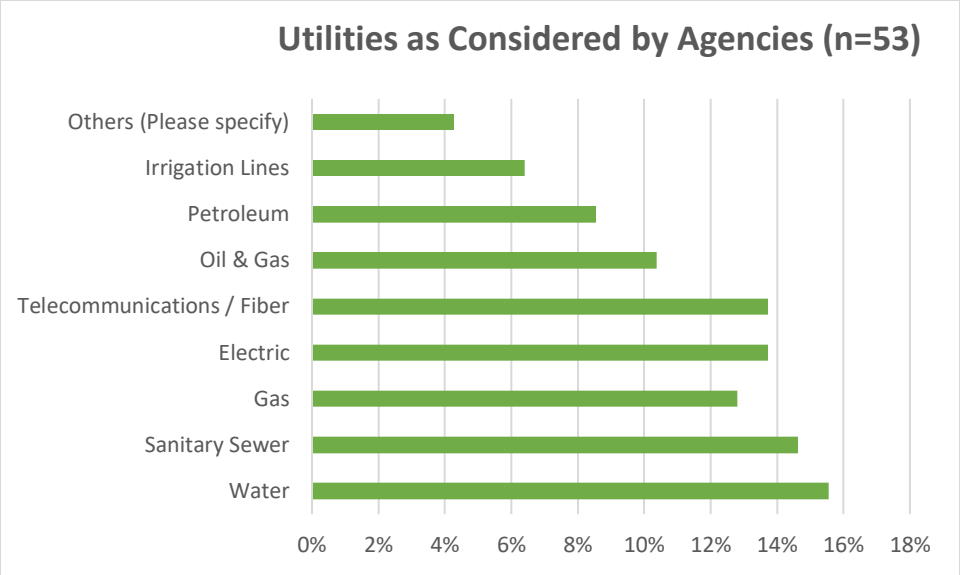


Figure 3. Utilities as considered by agencies

The results reveal that water, sanitary sewer, gas, and electric utilities are considered fundamental, universal utilities by agencies across Iowa. These major utility types are essential for communities and require access to public rights of way to provide services to customers. Telecommunications, fiber, oil/gas pipelines, and, to a lesser extent, petroleum pipelines show more variation in whether agencies define them as utilities. Telecommunications and fiber have become increasingly essential services, yet their status as utilities still varies. Oil/gas infrastructure may be viewed differently than telecommunications. The prevalence of each utility type likely influences whether agencies define them as utilities. For example, irrigation lines may be ubiquitous in some rural areas but absent in cities. Storm sewer infrastructure, though not a predefined choice, was commonly indicated as a utility in the open-ended response. Its importance for drainage and flood control leads many agencies to regulate it similarly to other utilities. Overall, the survey reveals some inconsistencies among agencies in the types of utilities that are formally recognized and regulated. Creating a more standardized statewide definition could streamline policies and practices. However, some flexibility enables agencies to accommodate utilities that are more or less prominent in their jurisdictions. Achieving greater consistency while allowing for regional variations may be an appropriate balance.

Recommendations

- Develop clear definitions for each utility type to ensure consistency and understanding among agencies. Examples include the following:

    - **Water:** Potable water distribution systems for residential, commercial, and industrial use
    - **Sanitary Sewer:** Wastewater collection systems for residential, commercial, and industrial use
    - **Gas (Distribution):** Natural gas distribution pipelines for residential, commercial, and industrial use

- **Electric:** Power distribution lines and facilities for residential, commercial, and industrial use
- **Telecommunications/Fiber:** Communication lines and facilities, including telephone, cable, and fiber optic networks.
- **Oil and Gas (Transmission):** Pipelines that transport crude oil and natural gas from wells to refineries or processing facilities
- **Petroleum:** Pipelines that transport refined petroleum products, such as gasoline, diesel, and heating oil
- **Irrigation Lines:** Water distribution systems for agricultural irrigation purposes
- **Storm Sewer:** Stormwater collection and conveyance systems for drainage and flood control

It is also important to distinguish between public and private utilities within these definitions, as they may have different characteristics, regulations, and management approaches.

- Encourage the adoption of a standardized list of utility types to be considered by agencies within their jurisdiction, based on the clearly defined utility categories. This will promote consistency in utility recognition and regulation across the state.
- Implement a statewide utility classification system that aligns with the standardized list of utility types. This system will ensure consistency across agencies and facilitate better coordination and data sharing among stakeholders.

3.4 Standard Accommodation

Respondents were asked whether their agency has a standard utility accommodation policy for placements in the ROW. Of 53 respondents, 58.49% answered in the affirmative, while 41.51% did not have a standardized policy, as shown in Figure 4. This indicates that over half of agencies have developed an accommodation policy, but a substantial portion have not formalized guidelines and rules managing the accommodation of utilities in their ROWs. Respondents also rated the adequacy and effectiveness of their current policies. Of 53 respondents, 63.46% assessed their policies as adequate/effective, while 36.54% felt they were inadequate or ineffective. This reveals that while most view their policies positively, over a third see room for improvement.

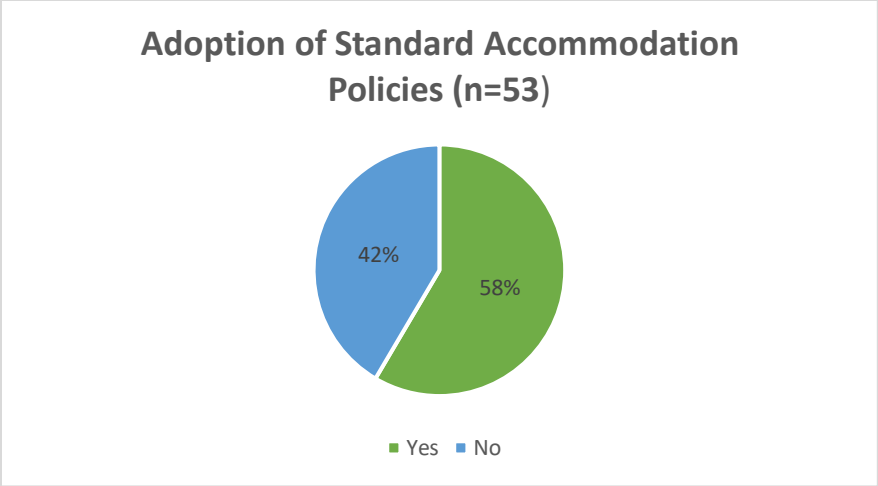


Figure 4. Adoption of standard accommodation policies for the ROW

Respondents were also asked whether their agencies' policies reference the Iowa DOT's statewide accommodation policy for primary roads titled "Policy for Accommodating and Adjustment of Utilities on the Primary Road System." Only 13.33% incorporated the DOT guidelines and policy, while the majority (86.67%) did not align with the state policy, as shown in Figure 5. This points to inconsistencies between state and local policies.

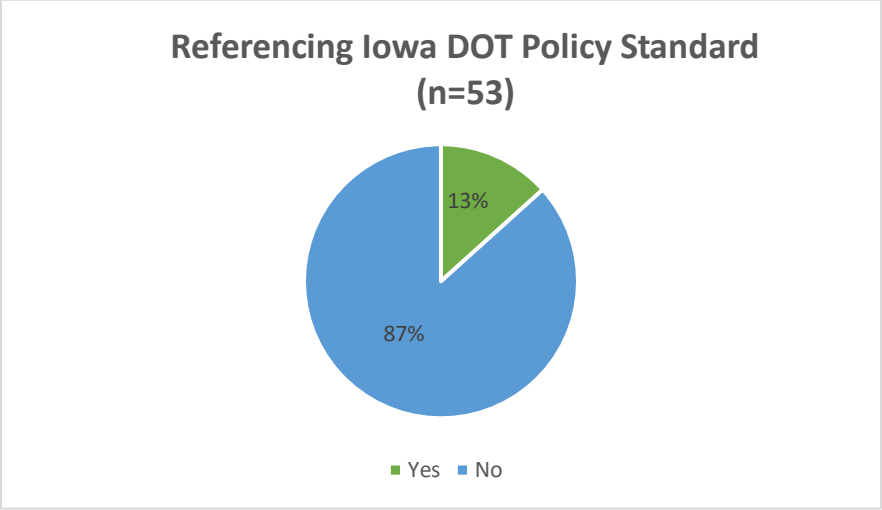


Figure 5. Referencing the Iowa DOT "Policy for Accommodating and Adjustment of Utilities on the Primary Road System"

The inconsistencies in alignment between state and local utility accommodation policies may be due to the differences in the function, needs, and characteristics of state and local transportation facilities. Interstate and state roadways normally provide connections between cities and encompass highways across the state and country. These roadways are designed for high speeds, typically 45 to 75 mph, to move people and goods efficiently. Safety is the top priority, and ROWs are wider to accommodate utilities while minimizing intersections to maintain traffic flow. The higher speeds also necessitate a focus on ride quality, leading to restrictions on utilities

under the pavement to avoid manholes in travel lanes and limit utility maintenance that could impact the traveling public. Pavement cutting is generally not allowed to maintain ride quality. Projects on these roadways are typically larger in both scope and length, allowing for designs that adhere to desirable rather than minimum standards.

In contrast, municipal and county roads are designed for lower speeds, typically 25 to 45 mph, catering to shorter trips for daily activities and local business use. Municipal streets are often more congested and may include curbs, gutters, and storm sewers. The limited space between the curb and ROW line often results in multiple utilities occupying this area, forcing some utilities to be located under sidewalks and streets. The denser population and higher traffic volumes necessitate more intersections and turn lanes, resulting in speed reductions and smaller projects that address specific location needs. Factors such as more frequent utility work, lower speeds, new service additions, limited space, constructability issues, and cost considerations often lead to allowing utilities under the pavement or sidewalks and permitting pavement cutting during installation or maintenance. This results in more traffic lane closures and impacts.

While there is a difference in the function and needs of the transportation systems, there is a need for uniformity in policy based on the design requirements for projects and the accommodation of utilities within each system. Although a local policy may allow certain accommodations that the state policy restricts, creating a tie or reference between the two policies would be beneficial to recognize the need for the inconsistency or the need to adhere to the more restrictive policy.

The results indicate that while standard accommodation policies are common, many agencies see room for improvement in the content, coordination, enforcement, and restoration aspects of their policies. The lack of alignment with the Iowa DOT's guidelines also points to inconsistencies between state and local policies. Critical deficiencies and concerns by the respondents as related to the adequacy and effectiveness of their utility accommodation standards include a lack of clear utility placement guidelines, poor coordination procedures for municipal projects, insufficient restoration standards, inadequate permit processes, etc. (see Appendix A). These gaps can lead to improperly located or damaged infrastructure, construction delays, and right of way conflicts. Furthermore, several respondents cited problems with utilities ignoring agency rules, damaging infrastructure, and doing restorations poorly. These comments highlight deficiencies in the enforcement, compliance, and remediation of utility work. The issues highlighted by respondents emphasize the need for accommodation policies that outline utility responsibilities, penalties for noncompliance, and vital restoration requirements. As utilities expand services statewide, aligning local policies with the DOT's guidelines could improve consistency for providers working across multiple jurisdictions. At the same time, some localization of procedures may be warranted based on geography, resources, and roadway types in different areas. Crafting standardized templates or model policies with room for localized adaptation could help balance consistency and flexibility.

Recommendations

- Develop a new (updated), comprehensive utility accommodation policy tailored to the specific needs and characteristics of the agency's transportation system (FHWA 2017).

- Adopt an adjacent city's policy, if applicable, to maintain consistency and coordination with neighboring jurisdictions.
- Use the state DOT policy as a foundation, and identify areas where the agency's policy will differ based on the unique requirements of the local transportation system (Iowa DOT 2012).
- Consider implementing separate policies for roadways with speed limits above and below 45 mph to account for the different design and safety considerations associated with each speed category. Develop a risk-based approach to utility accommodation policies, considering factors such as roadway classification, traffic volumes, and utility type to determine appropriate accommodation standards and requirements.

3.5 Permits and Registration Requirements

Permitting is a critical regulatory mechanism for utility accommodations. A key question was whether agencies require utility/ROW permits for installations. Of 47 respondents, 85.11% of agencies require permits or agreements for the installation of utilities in public rights of way, while 14.89% do not, as shown in Figure 6. This reveals that a large majority of agencies mandate permits, but over 15% still lack formal permit requirements.

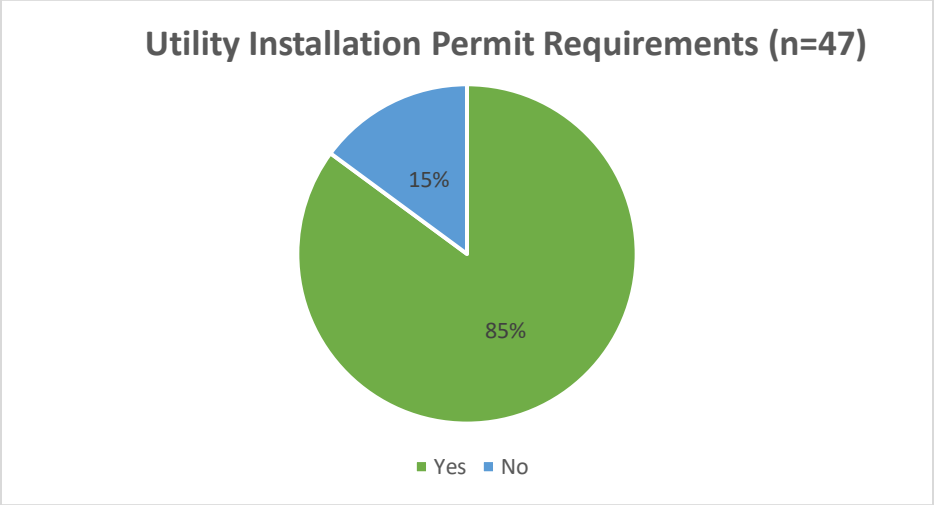


Figure 6. Utility installation permit requirements

Regarding fees for permits, only 34.78% of 46 respondents reported charging accommodation fees as part of the permitting process, compared to 65.22% who do not charge accommodation fees, as shown in Figure 7. This sizeable discrepancy indicates that fees are far from universally applied, with most agencies not charging accommodation fees.

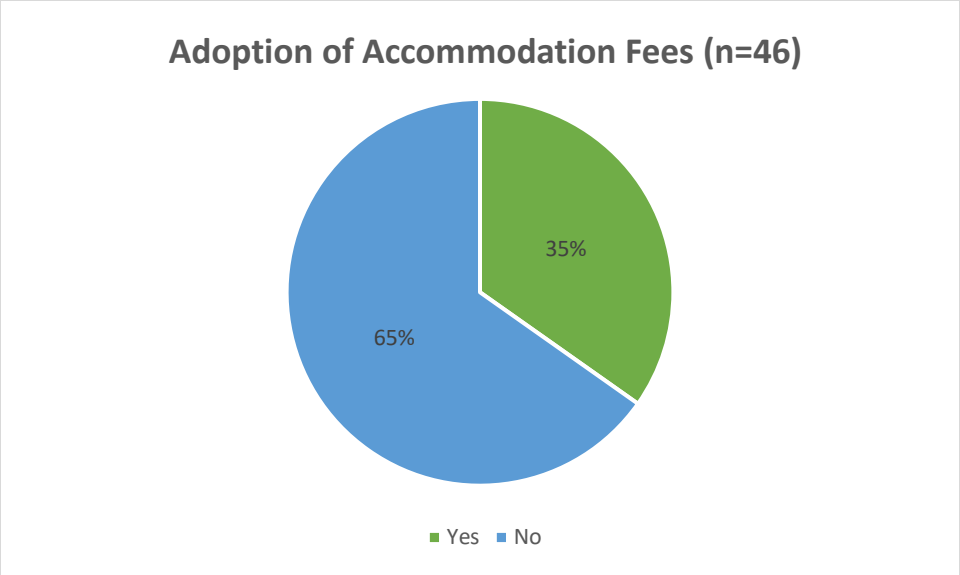


Figure 7. Adoption of accommodation fees

On pre-registration requirements prior to permitting, 68.18% of 44 respondents require things like company details and proof of insurance, i.e., making utility providers register with proof of insurance before applying for permits, which can streamline the permitting process. However, 31.82% do not mandate pre-registration, as shown in Figure 8. An overwhelming 85.71% said that permits are required for utility adjustments, relocations, or maintenance. Just 14.29% do not mandate permits for project changes, creating a compliance gap.

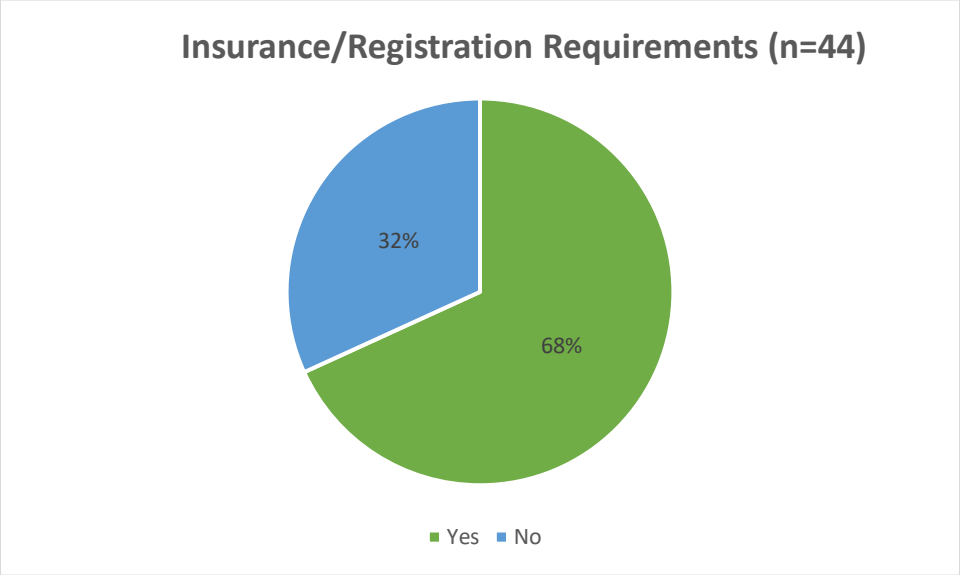


Figure 8. Insurance/Registration requirements

In a follow-up question seeking details on required permit information, the most prevalent permits required are utility-specific permits (44%) and general right of way permits (23%), as shown in Figure 9.

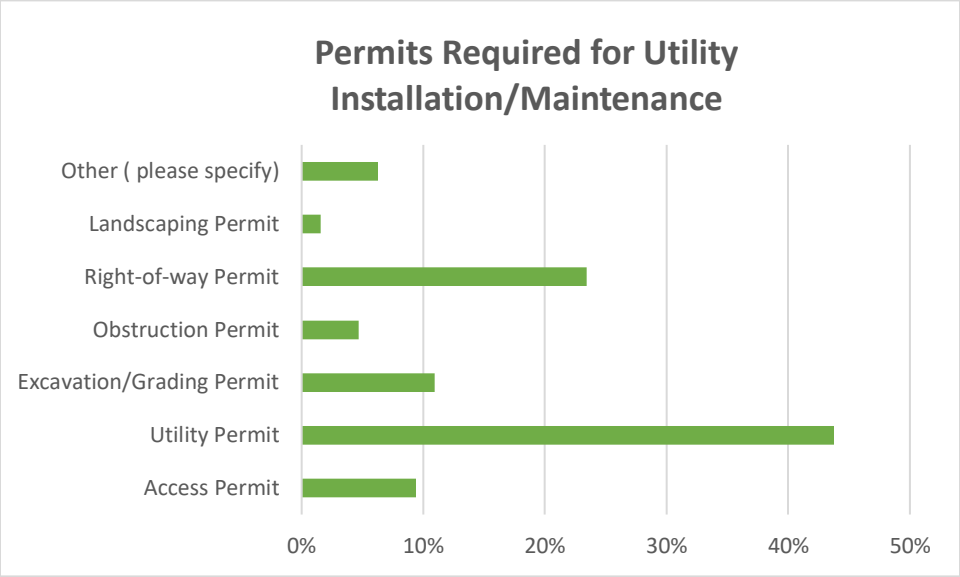


Figure 9. Permits required for utility installation/maintenance

Furthermore, the most common information required as part of a utility permit included utility plans/sketches, precise location data, and installation methods, as shown in Figure 10. These requirements reflect the importance that agencies place on documentation.

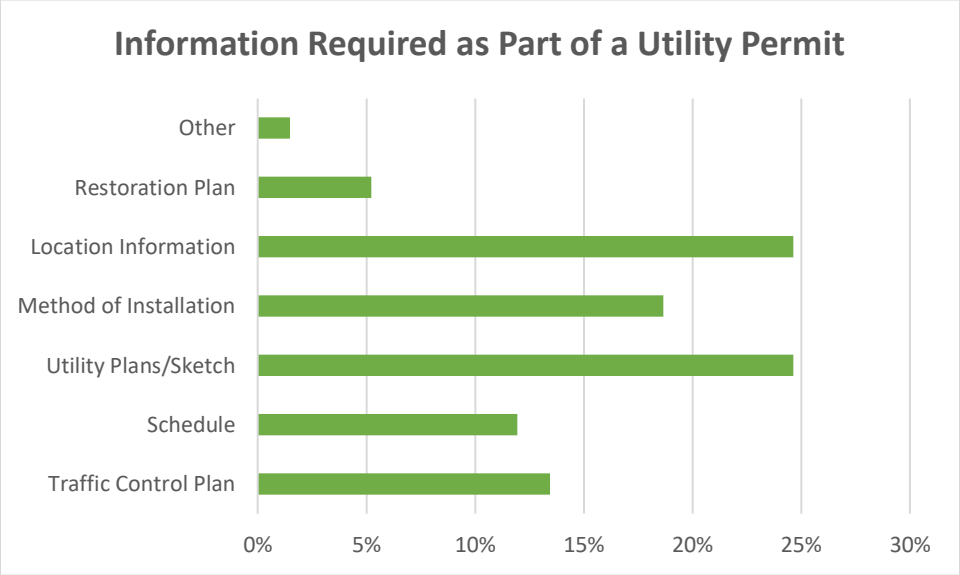


Figure 10. Information required as part of a utility permit

The results show that the vast majority of agencies require permits and pre-registration for utilities to install or perform work in the ROW. This reflects recognition of the importance of regulating and documenting this activity through formal permitting procedures. However, roughly 15% to 30% still apparently lack formalized procedures for permit or registration mandates. This enables unregulated installations that may be undocumented, unsafe, improperly located, or noncompliant with standards. While fees allow cost recovery, the survey reveals inconsistencies in their application.

The widespread permitting requirements indicate that most agencies acknowledge their benefits for oversight, safety, documentation, coordination, and cost recovery. However, further adoption of standardized permitting could improve unregulated areas. Key permit elements like location maps, plans, and installation methods also necessitate documentation. In summary, the survey highlights room for broader implementation of formal utility permitting and registration procedures to enhance regulation, coordination, cost recovery, and documentation for the public.

Recommendations

- Implement a comprehensive utility permitting system that standardizes the process for utility providers to obtain permits for installation, upgrades, or maintenance within public rights of way, integrating the system with GIS for efficient coordination and offering an online application and review process (Quiroga and Pina 2004).
- Mandate pre-registration for all utility providers, requiring them to submit company details and proof of insurance, and use this process to inform them about the agency's policies and standards, with a mechanism for regular updates to maintain accurate records and communication (Sturgill Jr 2023).
- Standardize permit fees based on utility type, work scope, and public infrastructure impact, ensuring that fees cover the costs of system administration and inspections, with clear communication to providers and regular updates to maintain alignment with agency objectives.
- Establish a robust compliance and enforcement program with clear performance standards for utility work, including regular inspections, a system for tracking violations with a tiered penalty structure, and staff training to enforce policies effectively.
- Develop a dedicated website to serve as a centralized resource for utility providers, communicating essential information such as contact details, permitting processes, forms, file types, delivery methods, and expectations for required information. Ensure that the website is user-friendly and regularly updated and that it includes clear instructions and guidelines to facilitate compliance with agency requirements (Quiroga et al. 2014b).

3.6 As-Built Documentation

Proper documentation of utility locations is critical for asset management and future coordination of utilities along the ROW. Therefore, respondents were asked whether utility providers are required to survey and locate their utilities after installation. Of the 39 respondents, only 23% require utility providers to survey or record locations after project completion, while a majority

of 76.92% do not require this procedure, as shown in Figure 11. This reveals that most agencies do not have mandated as-built surveying procedures, creating documentation gaps.

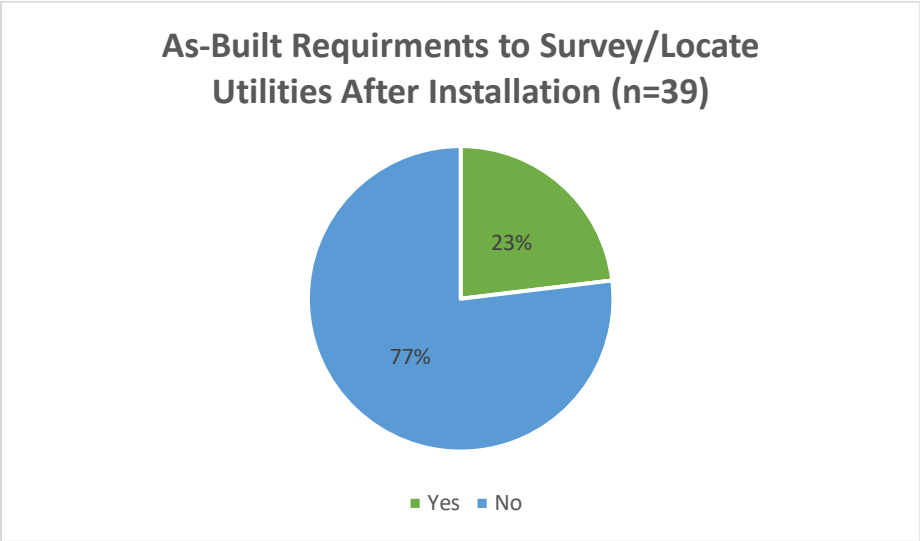


Figure 11. As-built requirements

Regarding the requirement to submit as-builts after installation, only 15.79% of 38 respondents mandate the submission of as-builts, as shown in Figure 12. A substantial majority of 84.21% do not require submission of as-builts, reflecting a major documentation gap.

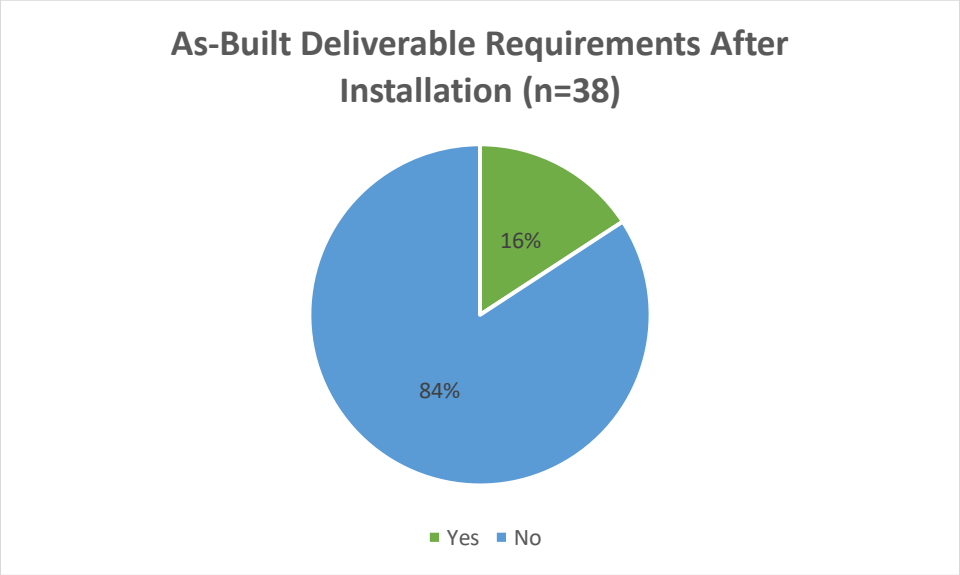


Figure 12. As-built deliverable requirements

Similarly, when asked whether agencies do receive as-builts from utility providers when mandated, a mere 7.89% of respondents said they typically receive as-built documents, while a concerning 92.11% do not receive as-built documentation on new utilities, indicating that

minimal documentation is provided and a lack of documentation prevails, as shown in Figure 13. Among the few who receive as-builts, it was noted that it takes one to two months on average after multiple requests from the agencies to receive such documentation from utility owners. This reveals extreme difficulties in obtaining documentation, even when required.

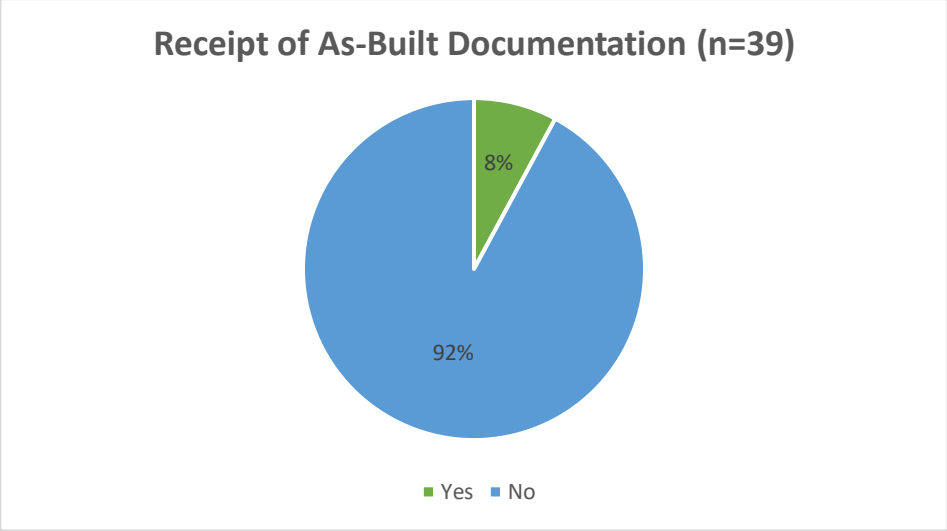


Figure 13. Receipt of as-built documentation

In summary, the results uncover a startling lack of utility as-built documentation being performed, mandated, or received by agencies. With only around 15% to 25% of agencies requiring or getting as-builts, there is very limited mapping/data on new utilities. This severe absence of as-builts fosters uncertainty and risks concerning installed utilities' locations, depths, materials, and specifications. The delays and repeated requests needed to obtain any documentation further show flaws in the process. Proper as-built records are crucial for documenting accurate utility infrastructure locations for future coordination and safety. However, based on the survey highlights, implementing rigorous as-built requirements, enforcement methods, and collaborative information sharing should be prioritized to improve documentation and data on new utility infrastructure. Standardized as-built documentation standards would also streamline the currently inconsistent process.

Recommendations

- Mandate submission of as-built documentation, establishing clear guidelines and standards for content, format, and timeline. Require utility providers to submit as-built documentation within a specific timeframe (e.g., 30 days) after completing installation or maintenance work.
- Adopt ASCE 75 for as-built documentation to ensure consistent and reliable data across utility providers and projects (ASCE 75 2022).
- Standardize as-built documentation formats, such as computer-aided design (CAD) or GIS, and provide specifications and templates for data submission (Meis et al. 2020, Nassereddine et al. 2023).

- Integrate as-built data with agency systems, such as GIS and asset management platforms, to create a comprehensive inventory of utility infrastructure (Nassereddine et al. 2023, Wang et al. 2019).
- Establish consequences for noncompliance with as-built documentation requirements, such as monetary penalties, denial of future permits, or legal action, depending on the severity and frequency of the violation. Clearly communicate these consequences to utility providers and consistently enforce them to ensure compliance.

3.7 Utility Location Information

In terms of utility location information, respondents were asked what type of locational information is provided by utility providers. The most common responses were maps/drawings (36.36%), project-specific information (22.08%), and text descriptions (15.58%), as shown in Figure 14.

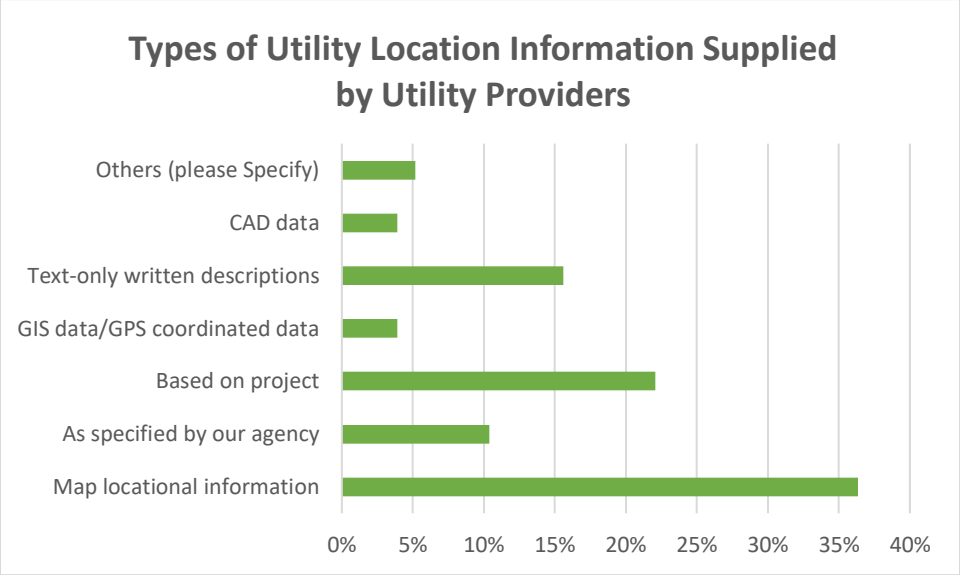


Figure 14. Types of utility location information supplied by utility providers

Geospatial data in GIS/Global Positioning System (GPS) format (3.90%) and in CAD format (3.90%) were the least prevalent responses. Regarding ways of indicating field locations, most agencies rely on distances from road centerlines (39.62%) and property lines (32.08%), as shown in Figure 15. Curb lines (15.09%) and other methods (13.21%) were less frequent responses (see Appendix B for more information types).

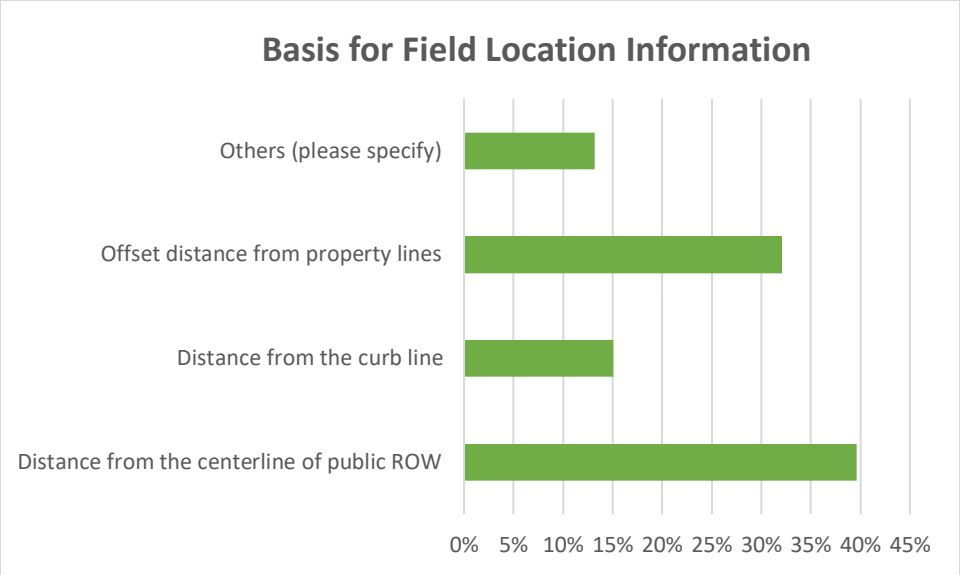


Figure 15. Basis for field location information

These results indicate that traditional location data techniques such as maps, drawings, and text are still the primary methods utilities used to convey location information. However, these methods lack the accuracy and precision of modern geospatial GIS/GPS and CAD data, which very few utilities seem to be leveraging. Referencing locations based on property lines or distance from road centerlines rather than exact coordinate points also introduces variability and uncertainty into utility mapping. The prevalent use of such vague referencing underscores the need to upgrade location data standards. Mandating the submission of geo-located utility infrastructure data in standardized digital formats like GIS and CAD would significantly enhance the consistency, clarity, and accuracy of information exchanged. However, the survey reveals that most utilities still rely on outdated, imprecise techniques for mapping new installations.

To promote future coordination and safety, agencies should make the adoption of digital geospatial data standards a priority for utility mapping. Appropriate training and resources may help utilities transition to more sophisticated mapping capabilities. To modernize utility mapping, agencies should mandate digital standards with appropriate support to improve adoption.

Recommendations

- Adopt and enforce utility mapping standards, such as ASCE 38-22, while leveraging advanced utility locating technologies, such as ground-penetrating radar (GPR) and 3D laser scanning, to improve the accuracy and comprehensiveness of utility location data (Anspach and Scott 2019, Sturgill et al. 2022).
- Implement a centralized utility data repository for storing, managing, and sharing utility location information across the agency and with relevant stakeholders (Quiroga et al. 2018).
- Promote stakeholder collaboration and data sharing through regular meetings, workshops, and data sharing agreements (FHWA 2018).

3.8 Installation Guidelines

The survey asked whether agencies have formal and standard utility location guidelines for rights of way. Of 37 respondents, 51.35% indicated that they have guidelines specifying where certain utilities should be located within rights of way, while 48.65% do not, as shown in Figure 16. This reveals that nearly half of the agencies lack formal utility placement guidance, enabling inconsistent and potentially hazardous siting. Regarding oversight of underground installation methods, a majority (72.22%) have defined standards for details like minimum depth of buried utilities, while 27.78% do not regulate any underground practices, representing a considerable regulatory gap.

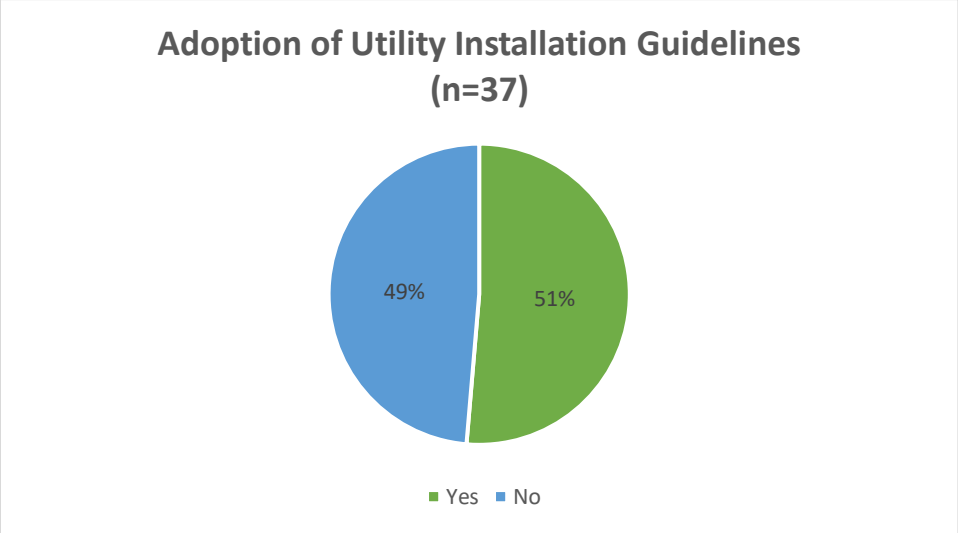


Figure 16. Adoption of utility installation guidelines

As shown in Figure 17, the most widely permitted underground techniques were directional boring (23.53%), open trenching (22.22%), and direct burial (17.65%), all methods with limited ground disruption. More destructive jacking and cutting were less common.

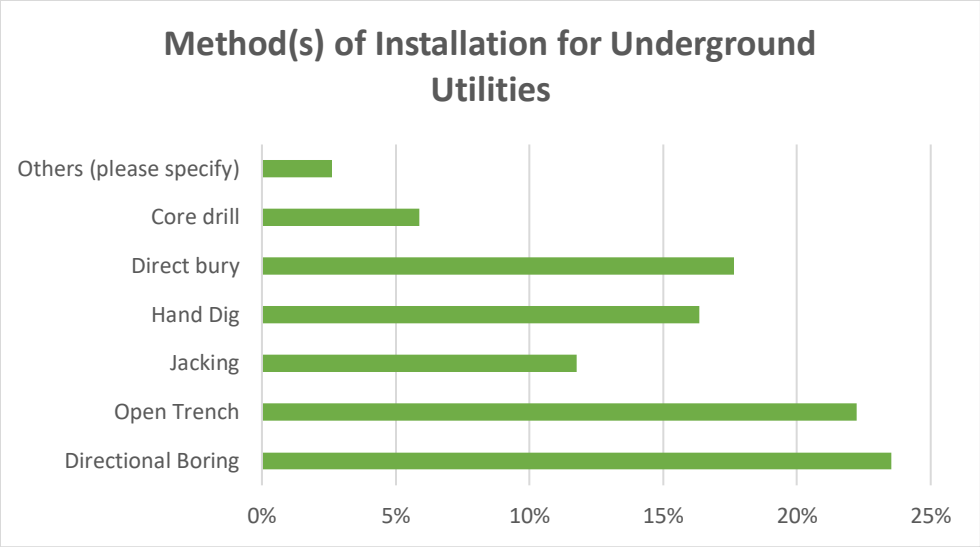


Figure 17. Method(s) of installation for underground utilities

In terms of the standard required information for installing utilities, 72.22% of respondents require key underground utility specifications like depth and materials, while 41.67% lack such mandates for aboveground utilities, as shown in Figure 18.

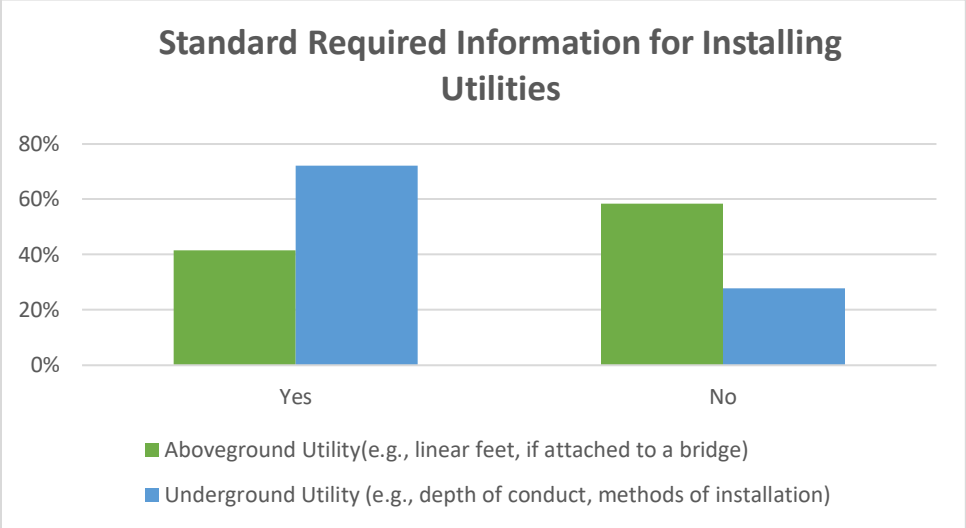


Figure 18. Standard required information for installing utilities

Additionally, 46% of respondents encourage or mandate co-location of utilities where feasible, as shown in Figure 19.

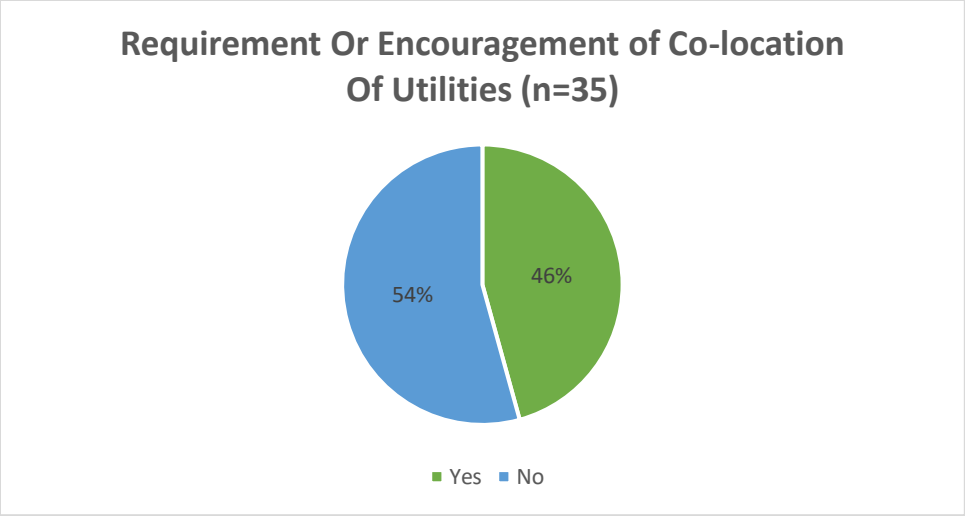


Figure 19. Requirement or encouragement of co-location of utilities

The results show inconsistencies in utility location and installation guidelines. While around half of agencies provide placement guidance, the rest do not, enabling unregulated installations. Nearly 30% also lack mandated underground techniques, allowing utility providers to install infrastructure in potentially unsafe or disruptive ways. This variability leads to installations that may be unreliable, poorly documented, or damaging to public infrastructure. While most agencies regulate key underground utility specifications, stronger aboveground utility guidelines are needed. Standardizing location and method mandates where lacking would provide greater assurance that utility placements meet safety and reliability standards.

In summary, the survey reveals gaps in utility placement and installation guidelines for a significant number of agencies. More robust and consistent mandates and stringent enforcement should be prioritized to ensure that utilities meet quality standards.

Recommendations

- Develop and maintain comprehensive utility installation guidelines that cover all aspects of utility placement, construction, and maintenance within public rights of way (Quiroga et al. 2009, TAC 2013).
- Establish clear utility placement and location criteria, considering factors such as roadway classification, available space, existing infrastructure, future transportation needs, and safety requirements. Prioritize the avoidance of clear zones and minimize the impacts of construction and maintenance activities on the traveling public (AASTHO 2011, Thorne et al. 1993).
- Specify approved installation methods and materials for different utility types and site conditions, encouraging the use of trenchless technologies and high-quality, durable materials (Ariaratnam et al. 2013, Najafi 2010).
- Mandate proper site preparation and restoration, establishing clear requirements for site preparation activities and specifying required restoration methods and materials.

- Encourage coordination and co-location of utilities whenever possible to minimize the number of excavations, reduce traffic disruptions, and optimize the use of available right of way space (Quiroga et al. 2012).

3.9 Utility Corridors

Designated utility corridors consolidate utility infrastructure along the ROW. Respondents were asked whether agencies utilize designated utility corridors to consolidate utilities. Only 25.71% of respondent agencies currently utilize utility corridors, while 74.29% do not utilize utility corridors, as shown in Figure 20. This indicates that corridors are significantly underutilized, with only about one-quarter of agencies proactively utilizing them. Of the few agencies using corridors, 44.44% use the term "utility corridors" to describe them, while 55.56% use terminology other than "utility corridors," indicating inconsistent language.

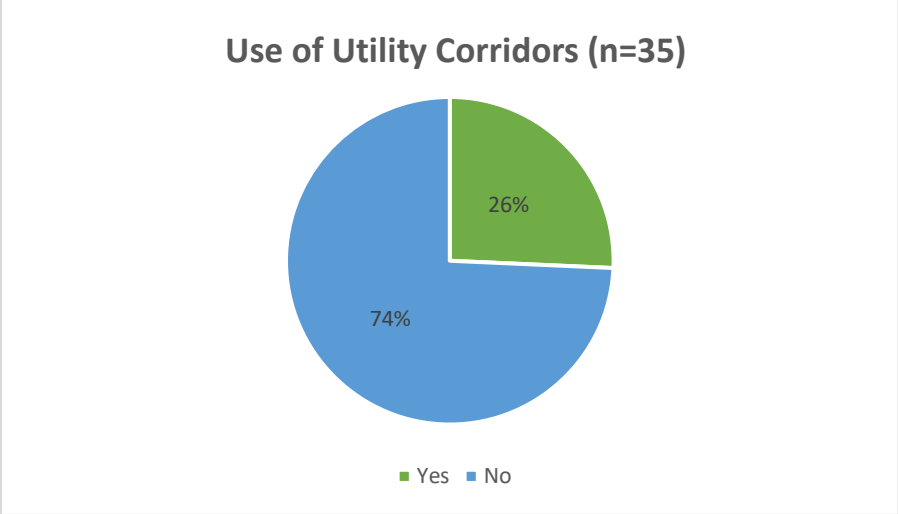


Figure 20. Use of utility corridors

Regarding utility corridor policy, only 5.88% of agencies have formal procedural standards governing the usage of utility corridor structures. A substantial 94.12% lack official policies around utility corridors, as shown in Figure 21.

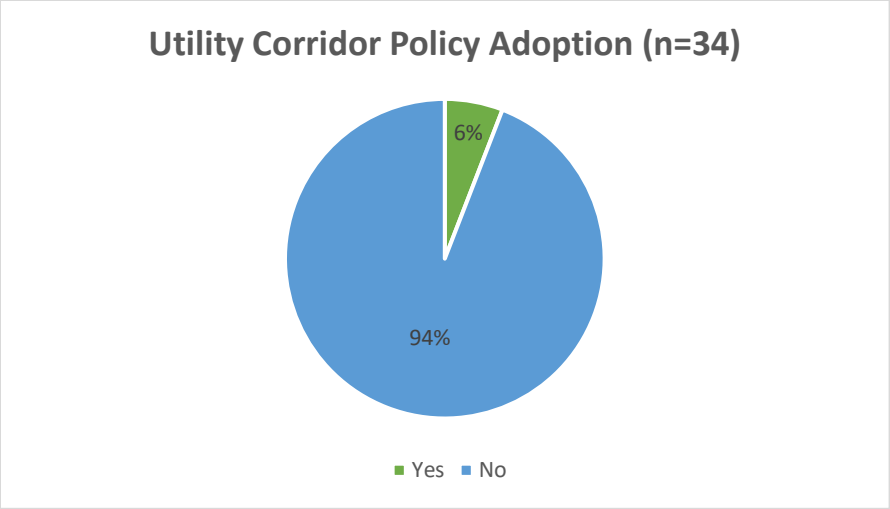


Figure 21. Utility corridor policy adoption

On procedures for coordinating work in congested roadway areas, just 20.59% of agencies have defined processes, as shown in Figure 22. The large majority, 79.41%, lack coordination processes for crowded, complex utility corridors, demonstrating a need for better planning approaches in constrained areas.

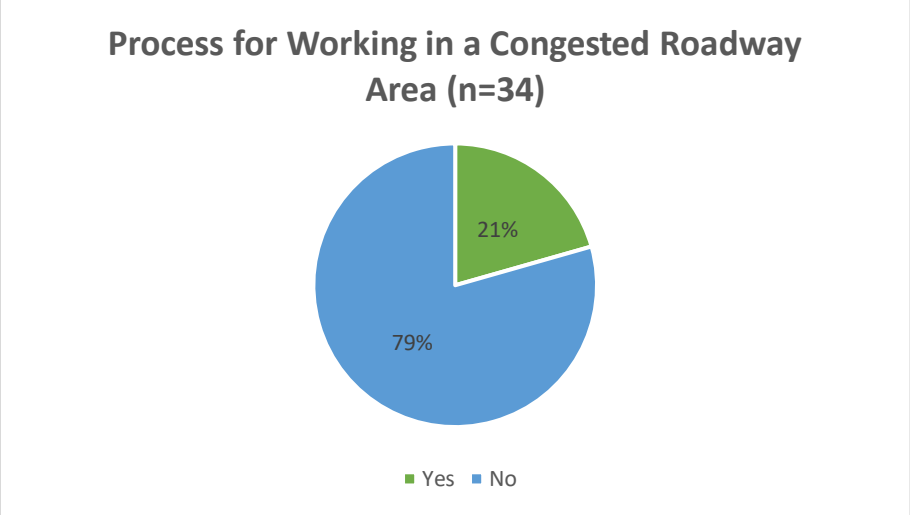


Figure 22. Process for working in a congested roadway area

Furthermore, the survey asked respondents whether they require utility co-location as part of working in congested utility corridors. Only 42.86% of the 7 respondents indicated that they do mandate co-locating utilities in crowded corridors. This indicates that the majority of agencies (57.14%) do not require utilities to share conduits in congested areas. This result demonstrates that there is a widespread lack of coordination policies requiring utilities to consolidate in crowded corridors. By not requiring co-location, agencies are missing opportunities to minimize construction disruption, costs, and congestion in high-density utility zones. Additionally, the survey asked whether agencies proactively install extra conduits themselves for future leasing to

utilities. Only 8.57% of respondents agreed with this practice of agencies installing reserve conduits, as shown in Figure 23. The very low percentage shows that most agencies are not actively taking measures to coordinate future utility installations by reserving extra conduit space when they construct projects.

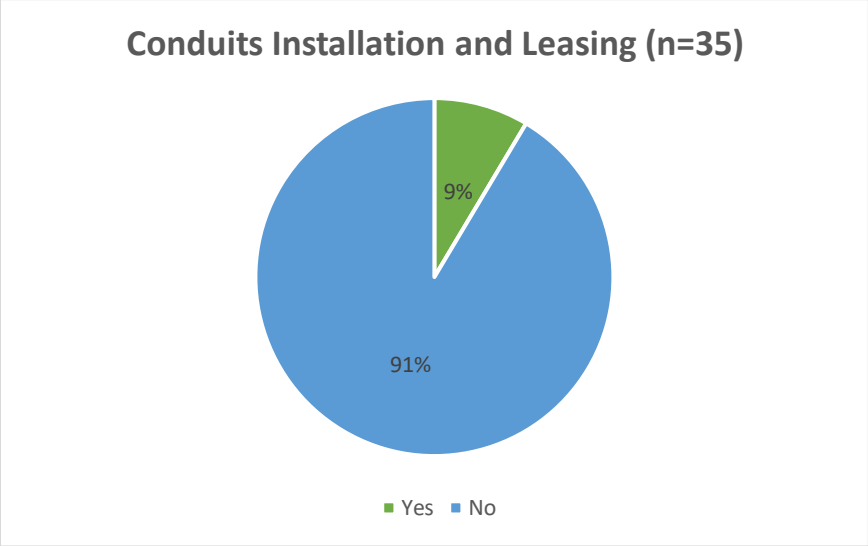


Figure 23. Conduit installation and leasing

Although 30% of agencies expressed potential interest in exploring conduit leasing, over 70% were not considering it at the time of the survey, as shown in Figure 24. This indicates that conduit leasing for future utility needs is still a very limited practice among most agencies.

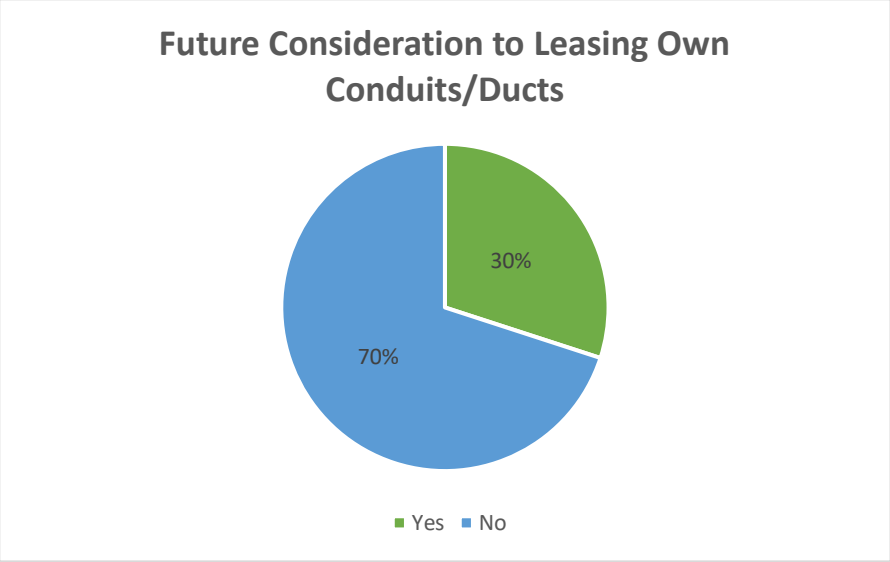


Figure 24. Future consideration of leasing own conduits/ducts

These results indicate that utility corridors are significantly underutilized, with only around 26% of agencies employing them. Among the limited number of users, terminology differs, and formal policies are rare. This suggests that most corridor usage happens on an ad hoc basis rather than through robust planning procedures. The severe lack of coordination processes in congested areas also highlights deficiencies in managing complex, crowded corridors. Without streamlined procedures, congested zones likely suffer more conflicts, delays, and costs from uncoordinated work. Structuring and standardizing corridor policies could improve transparency and coordination between agencies and utilities. Defined processes for congested corridors would also help mitigate construction impacts. While corridors may not suit all areas, they can maximize efficiency in concentrated infrastructure zones. The results show the limited adoption of utility corridors as a management strategy. Targeted corridor policies could improve congestion management.

Recommendations

- Develop and implement a utility corridor management plan that outlines goals, strategies, and procedures for designating, managing, and optimizing utility corridors within public rights of way (Kuhn et al. 2002). By integrating established regulatory frameworks, such as the "Utility Strip" concept defined in 23 C.F.R. 645, the plan could ensure consistent and coordinated utility management that adheres to federal guidelines.
- Encourage the use of utility corridors in congested areas, developing incentives or requirements for utility providers to utilize shared corridors or co-locate facilities (Kuhn et al. 2002).
- Partner with utility companies to identify issues and find resolutions for sharing utility infrastructure. Establish regular communication channels, joint working groups, and collaborative decision-making processes to foster a cooperative approach to utility corridor management.
- Explore opportunities for joint trenching and shared infrastructure initiatives, developing guidelines and standards for cost-sharing, liability, and maintenance responsibilities.
- Monitor and evaluate corridor performance, using data to identify trends, challenges, and opportunities for improvement, and regularly report on the status and performance of utility corridors.

3.10 Removal and Abandonment Procedures

Abandoned utilities that remain indefinitely in rights of way contribute to congestion issues within utility corridors. Therefore, the survey asked whether agencies have defined processes for changing the status of or removing utilities in rights of way. Only 8.82% of respondents indicated that they have a defined procedure, while a substantial 91.18% lack formal procedures for utility removals or status changes, as shown in Figure 25.

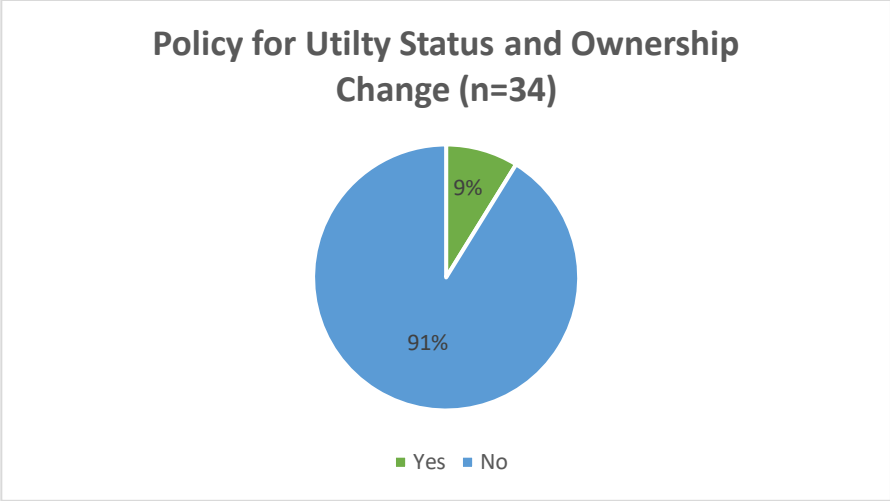


Figure 25. Policy for changing utility status and ownership

Regarding permitting processes specifically for abandoning utilities, only 5.88% of agencies have streamlined permitting protocols. An overwhelming 94.12% do not have formal permitting procedures for abandonment, as shown in Figure 26.

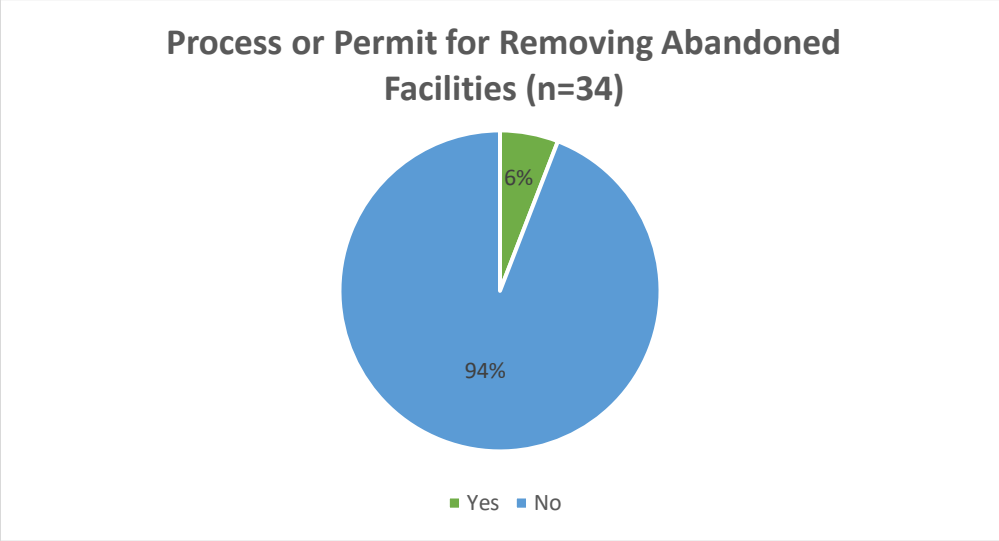


Figure 26. Process or permit for removing abandoned facilities

However, 22.86% of respondents said they allow controlled utility status changes, like repurposing a water line as a fiber conduit. Still, 77.14% do not permit utilities to change functional status, as shown in Figure 27.

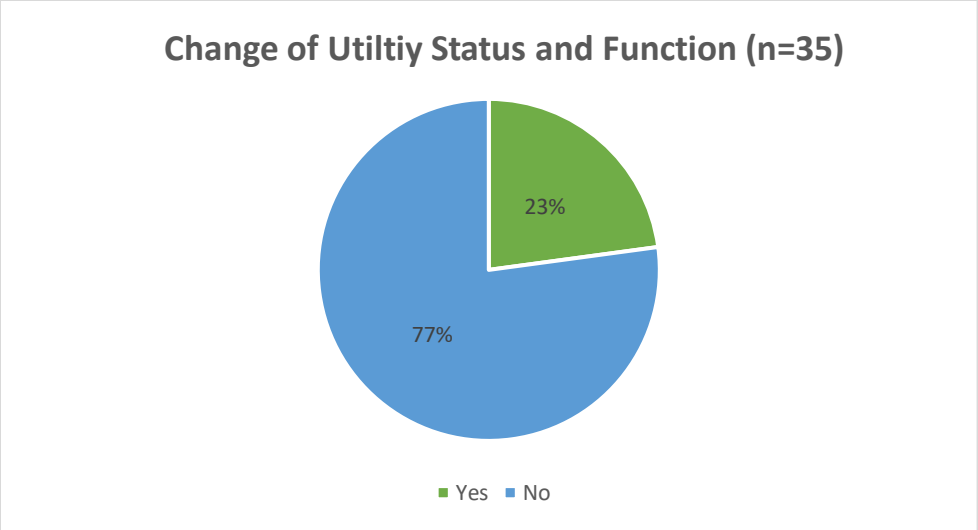


Figure 27. Allowance of the status of a utility to change for another function

The results reveal an enormous gap, with over 90% of agencies lacking formalized procedures for removing abandoned infrastructure or altering utility status. This unregulated abandonment enables obsolete utilities to remain in the right of way indefinitely. It fosters congestion and inaccuracies in mapping as original purposes change or vanish over time without documentation. While potential risks exist in allowing status changes, controlled policies could facilitate appropriate infrastructure transitions. However, the survey shows that current oversight and documentation of changes are severely limited. Establishing standardized removal, status change, and abandonment policies, along with mapping and record-keeping requirements, would provide structure and transparency that is now lacking. In summary, the survey highlights a need for regulated utility removal and status change policies to enhance the management of aging infrastructure as communities' needs change over time.

Recommendations

- Develop and implement a comprehensive utility removal and abandonment policy that clearly states the utility's ownership and full responsibility for abandoned lines. Define criteria, conditions, and documentation requirements for removal or abandonment, considering that abandoned utilities cause the same problems and delays as active utilities (CDOT 2021).
- Require the removal of abandoned utilities whenever feasible, establishing criteria for determining when removal is necessary and allocating costs between utility providers and the agency. When removal is not possible, establish standards for the safe and proper abandonment of utilities in place (CDOT 2021).
- Implement a permitting and approval process for utility removals and abandonments, requiring the submission of detailed plans, specifications, and schedules. Develop a tracking and management system for abandoned utilities, integrating data with the agency's GIS, asset management, and permitting systems.

- Standardize a process for handling abandoned lines, such as having an on-call contract to remove them when encountered during construction or maintenance activities. Provide training and outreach on removal and abandonment procedures, creating user-friendly guidance documents, checklists, and templates to assist stakeholders in understanding and complying with requirements (CDOT 2021, Fort Worth City 2012).

3.11 Restoration Standards

When asked whether agencies have standard procedures for utility cut restorations in pavements, 54.29% of respondents indicated that they have standard procedures for utility cut restoration, while 45.71% lack formal restoration standards, as shown in Figure 28. Of the agencies with procedures, 77.78% said that they provide satisfactory outcomes. Still, 22.22% indicated that their restoration standards remain ineffective or deficient.

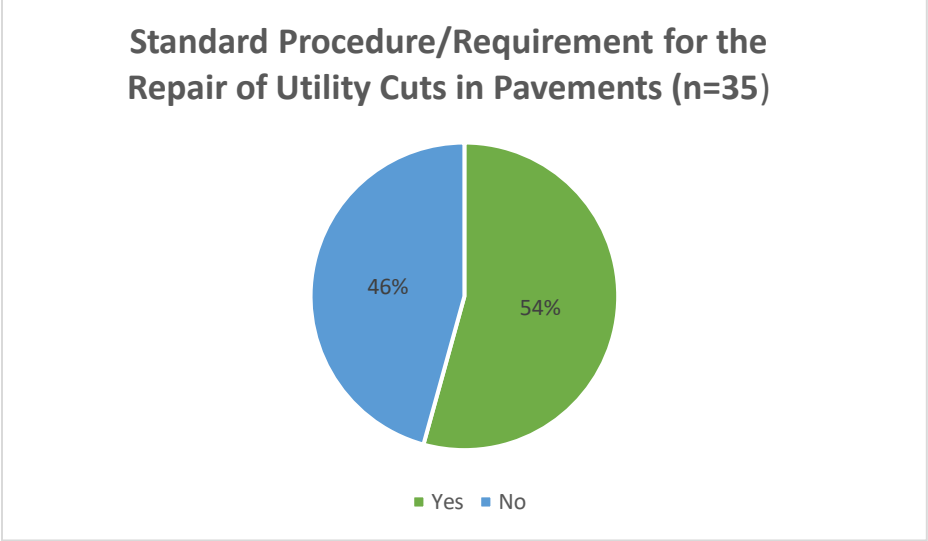


Figure 28. Standard procedure/requirement for the repair of utility cuts in pavements associated utility installations or maintenance

Only 41.18% of respondents said that they have defined warranty or liability periods for utility cut repairs, as shown in Figure 29. A majority (58.82%) lack standard defect liability clauses, limiting accountability.

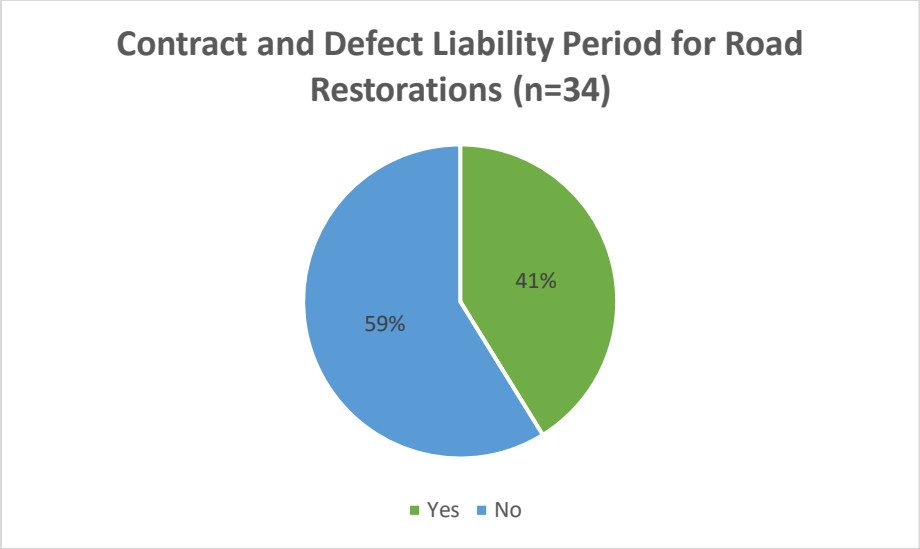


Figure 29. Contract and defect liability period for road restorations as a result of damage by utility work

However, 73.53% of respondents do require liability insurance or bonds from utilities working in the right of way. Just 26.47% do not mandate insurance/bonding requirements, as shown in Figure 30.

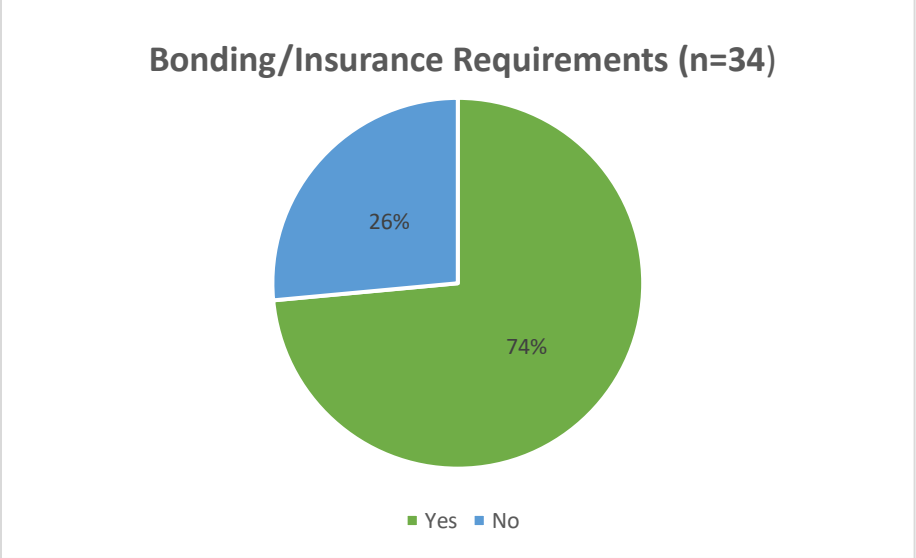


Figure 30. Bonding/Insurance requirements

The results show that many agencies lack formalized restoration standards and warranty clauses after utility cuts are made in the pavement, with nearly half of respondents indicating that their agencies lack codified procedures. This enables inconsistencies in repair quality. Even among agencies with existing procedures, over 20% feel that their restoration standards are still inadequate. The widespread absence of defined liability timeframes also limits utilities'

responsibility for defects. While most agencies appear to require insurance or bonds from utilities as a protective measure, the gaps revealed in formalized restoration standards and defect warranties remain challenging.

Instituting more rigorous and consistent repair requirements, with clearly defined liability periods, could strengthen patching quality and accountability after utility cuts. Enforcement checkpoints are also key to guaranteeing that standards are satisfied. Utility work that improperly restores roadways can affect roadway quality and quicken the deterioration of roads. The survey indicates room for improvement in pavement restoration standards and accountability procedures following utility cuts.

Recommendations

- Develop and implement customizable utility cut restoration standards, providing guidance and templates for agencies to develop their own detailed specifications based on local conditions. These standards should include a flexible warranty and liability system, allowing agencies to set terms and conditions based on their risk tolerance and legal requirements (CDOT 2021).
- Establish a scalable quality assurance and inspection program for utility cut restoration work, providing guidance and best practices for developing and administering inspection programs (Thorne et al. 1993). Require the submission of restoration plans and as-built documentation, tailored to agency needs and capabilities, and encourage the use of digital platforms and data management systems to streamline the process.
- Foster communication and coordination among stakeholders, providing guidance and best practices for establishing communication protocols, dispute resolution procedures, and stakeholder engagement strategies tailored to local contexts.

3.12 Summary

The survey aimed to assess current policies and practices for utility management in public rights of way across various agencies in Iowa. Several core areas were examined, including accommodation policies, permitting requirements, installation guidelines, location documentation requirements, corridor usage policies, abandonment procedures, and restoration standards following installations.

The results reveal some common challenges and deficiencies:

- Inconsistencies exist in utility management policies and in coordination between state and local agencies as well as with utility providers. Very few agencies align their policies with statewide DOT standards.
- Permitting and registration requirements are still lacking for 15% to 30% of agencies, enabling unregulated utility installations.
- Severe gaps exist in the as-built documentation and mapping of newly installed utilities, causing uncertainties in location data.

- Around half of agencies lack adequate guidelines for locating utility installations and adequate oversight of the methods used by utilities.
- Formal planning policies are rare for utility corridors and congested rights of way, leading to conflicts and inefficiencies.
- The removal of abandoned utilities and the process for changing utility status are largely unregulated, resulting in inaccuracies and congestion over time.
- Restoration standards and defect warranty periods necessary to ensure quality repairs after utility cuts are frequently absent.

These findings highlight areas needing improvement, such as policy alignment, permitting, documentation, congestion management, abandonment, and restoration. Standardizing effective procedures where lacking could improve transparency, coordination, location data, construction oversight, infrastructure longevity, and public satisfaction.

In summary, while some standard policies and practices exist in many agencies, the survey identified key utility management deficiencies that should be addressed through robust, consistent solutions to benefit all stakeholders. A focus on policy integration, geospatial data standards, congestion coordination, restoration accountability, and proactive infrastructure planning is recommended based on the survey results.

CHAPTER 4. RECOMMENDATIONS FOR ENHANCING UTILITY MANAGEMENT PRACTICES AND SYSTEM REVIEW OF SELECT MUNICIPALITIES

4.1 Recommendations for Utility Management in Iowa

The survey results paint a clear picture of the current state of utility management practices across Iowa, highlighting both successes and areas for improvement. While many agencies have made strides in establishing standard policies and procedures, inconsistencies and gaps remain, particularly in the areas of policy alignment, permitting, documentation, congestion management, abandonment, and restoration. The following list highlights several key findings and recommendations gathered from the survey and the study's additional data collection efforts for utility management practices in Iowa:

1. **Need for statewide standardization:** The survey reveals inconsistencies in utility accommodation policies and practices among state and local agencies as well as with utility providers. Very few local agencies currently align their policies with statewide DOT standards, indicating a lack of cohesion. The Iowa DOT has an opportunity to take a leadership role in developing and promoting standardized utility management practices across the state.
2. **Importance of digital as-built documentation:** The survey exposes severe gaps in the as-built documentation and mapping of newly installed utilities. These gaps can lead to inaccuracies and uncertainties in location data. The Iowa DOT can drive modernization in this area by mandating statewide digital as-built documentation standards, such as GIS-based utility mapping, to significantly improve location accuracy and facilitate data sharing among agencies.
3. **Potential benefits of utility corridors:** Utility corridors along highways appear to be underutilized, with only a small percentage of agencies actively implementing them. The Iowa DOT could conduct a study to identify areas where utility corridors would be most beneficial and develop official planning procedures to maximize the advantages of these corridors in terms of infrastructure consolidation and coordination.
4. **Need for improved congestion management:** The survey indicates that formal planning policies for utility corridors and congested rights of way are rare. The absence of such policies can lead to conflicts and inefficiencies. The Iowa DOT has an opportunity to pioneer streamlined coordination protocols for crowded highway utility zones to reduce delays, costs, and disruptions associated with utility work in these areas.
5. **Importance of permitting and installation oversight:** While permitting and installation guidelines for state highway rights of way should be diligently followed and enforced, the survey suggests that oversight is inconsistent in many areas. The Iowa DOT should prioritize the enforcement of these regulations to ensure compliance and minimize potential issues related to improper utility installations.
6. **Necessity of robust restoration standards:** The survey reveals that restoration standards and defect warranty periods, which are crucial for ensuring quality repairs after utility cuts, are frequently absent. The Iowa DOT should establish rigorous procedures and warranty requirements for utility work on state highways to maintain infrastructure integrity and longevity.

7. **Regulation of abandoned and changing utilities:** The removal of abandoned utilities and the process of changing utility status appear to be largely unregulated, resulting in inaccuracies and congestion within the rights of way over time. The Iowa DOT should develop standard procedures for managing abandoned utilities or changing the status of utilities along highways to minimize clutter and maintain accurate records.

These key inferences underscore the need for the Iowa DOT to take a proactive approach in helping to address the identified challenges and deficiencies in utility management practices across Iowa. This proactive approach is already evident in the research put forward by the Iowa DOT, the host of policy and rule improvements being implemented, and the outreach efforts that have been initiated, such as the training provided by this project. By focusing on policy integration, geospatial data standards, congestion coordination, restoration accountability, and proactive infrastructure planning, the Iowa DOT can lead the way in promoting consistent, efficient, and sustainable utility management practices throughout the state.

4.2 Review of Utility Management Systems and Approaches Used in Iowa

In recognition that the recommendations above require additional effort and resources by municipalities that are likely to have staffing and resource constraints, the research team sought to develop additional recommendations related to technology and tools that might be able to supplement these limited resources.

Technology for Permitting Systems

One additional area investigated was permitting approaches and systems used by municipalities in Iowa. As identified in the survey feedback, it was determined that a range of permitting approaches is used across Iowa, and this could be an area for improved consistency. The research team targeted larger cities, believing that they would be most likely to have investigated and invested in more advanced utility permitting systems. The 15 largest cities in Iowa, each having a population of over 40,000 people, were contacted via email and phone to determine the type of utility permitting system they used. Responses were not captured from each municipality, but the results are shown in Table 3.

Table 3. Summary of permitting systems used by Iowa's largest municipalities

City	ROW Permitting System	Permit Process Fees	Accomm. Fees	Utility Provider Registration	Information Required (as Part of a Utility Permit)	Requirement to Survey/Locate Utilities after Installation	Requirement of As-Builts after Utility Installation	Liability Insurance Policy
Ames	ROWay	No	Yes	Yes	Traffic control plan, utility plans/sketch, method of installation, location information	Yes (use inspectors)	No, utility information is only stored for the agency's facilities	Yes ($1 million minimum)
Ankeny	-	-	Yes	Yes	Traffic control plan, utility plans/sketch, method of installation, location information	No	Yes	Yes
Bettendorf	-	-	-	-	-	-	-	-
Cedar Falls	CF1Stop	Yes	No	Yes	Traffic control plan, schedule, utility plans/sketch, method of installation, location information, restoration plan	No	Yes	Yes
Cedar Rapid	My CR	Yes	Yes	Yes	Utility plans/sketch, method of installation, location information	No	No	Yes
Council Bluffs	Paper form	Yes	Yes	Yes	-	No		
Davenport	Paper form	-	-	-	-	-	-	-
Des Moines	Paper form	-	-	-	-	-	-	-
Dubuque	ROWay	-	-	-	-	-	-	-
Iowa City	CSS portal electronic/paper form; no formal permitting system	Yes	No	Yes	Traffic control plan, schedule, utility plans/sketch, method of installation, location information, restoration plan	No	Yes (but not often received)	Yes
Marion	eSuite	-	-	-	-	-	-	-
Sioux	Form	-	-	-	-	-	-	-
Urbandale	Form	-	-	-	-	-	-	-
Waterloo	Paper form	No	Yes	Yes	Utility plans/sketch, method of installation, location information	No	No	Yes
West Des Moines	SharePoint	-	-	-	-	-	-	-

The findings from this effort reiterate the survey findings that there is a significant opportunity to improve consistency in permitting across Iowa. Aside from the possibility of allowing municipalities to improve the efficiency of their interactions with one another, consistency would lower the burden on utility companies seeking utility permits because these companies would be able to count on more consistency across Iowa municipalities. The topic of utility permitting was also a topic investigated by another of the Iowa DOT research projects that was occurring concurrently with this research effort. In the project *Early Identification and Location of Utility Facilities within Iowa DOT Project Footprints* (SPR-RE22(013)-8H-00), a scorecard was developed to evaluate several permitting systems across several criteria, including their ability to store information geospatially, automate workflows, facilitate reporting, etc. Figure 31 highlights three highly ranked commercial-off-the-shelf systems reviewed as part of that research. These systems offer opportunities for efficiency and support in utility permitting.

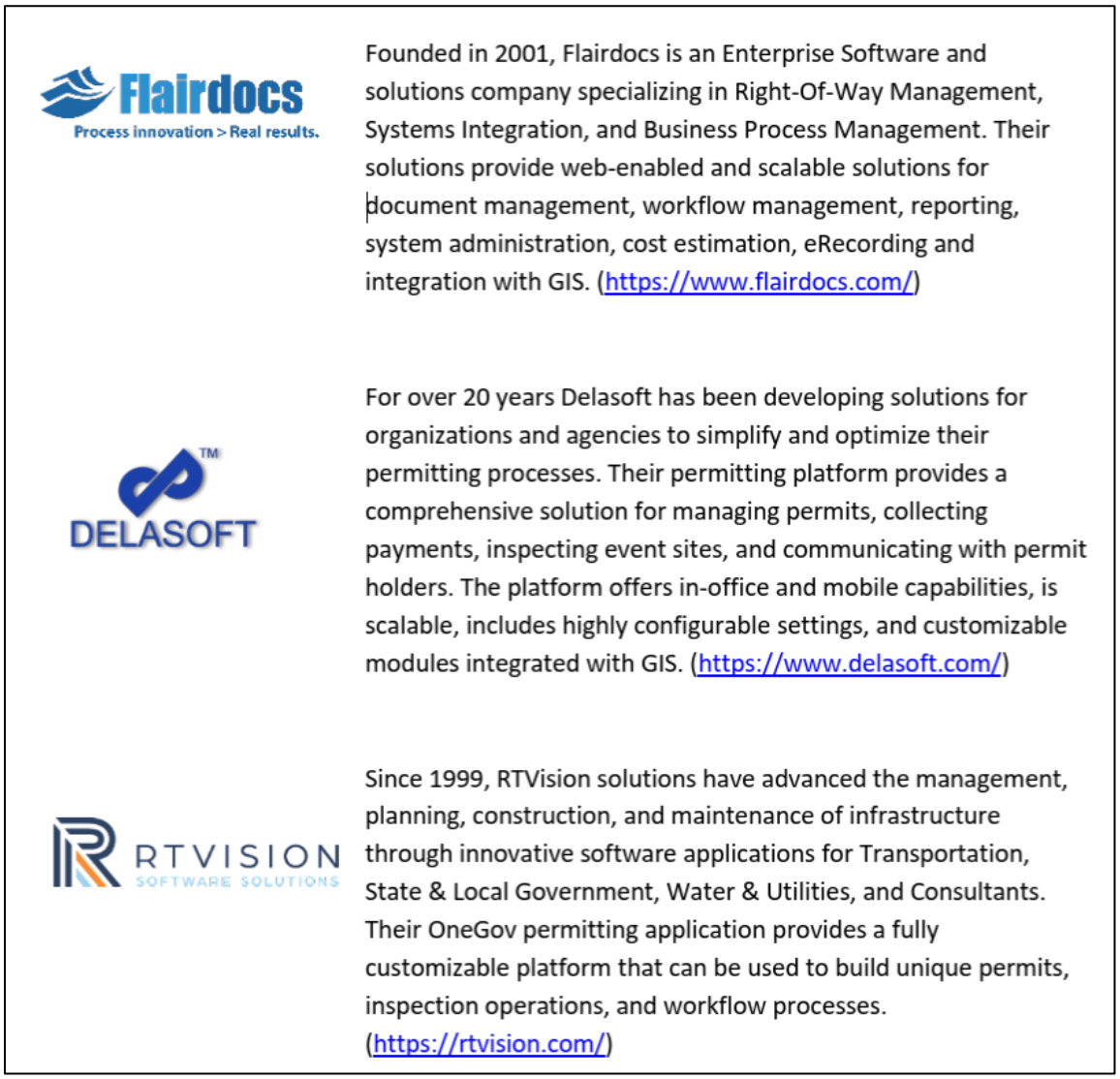


Figure 31. Reviewed utility permitting systems

Tools for Documentation and Utility As-Builts

Another recommendation regarding utility permitting is to improve the process for creating utility as-builts. While more advanced and detailed recommendations are described in *Early Identification and Location of Utility Facilities within Iowa DOT Project Footprints* (SPR-RE22(013)-8H-00) in terms of a federated system of sharing utility as-built data, there is an opportunity for technologies to assist in this area more immediately as well.

First, the creation of utility as-builts has historically included a range of approaches to collecting information, with varying levels of accuracy and appropriateness. It is recommended that utility as-builts be captured with geospatial accuracy. A utility as-built is less valuable when simply drawn with references to existing features, such as when a utility line is drawn on one side of the roadway or the other. Utility as-builts add value with captured locations of a known horizontal and vertical accuracy. The traditional capture of geospatially referenced utility as-builts involves expensive GPS equipment, training, and staffing resources, as seen in Figure 32.

Figure 32. Utility as-built creation with a traditional GPS rover

However, more recent advances in technology have allowed for the use of mobile devices to collect as-built information with high geospatial accuracy through photogrammetry and short-range LiDAR. Figure 33 shows the use of an Apple iPad Pro and a Vigram viDOC antenna to collect utility as-built information at a similar accuracy to a GPS rover. This system uses an RTK-corrected antenna to achieve improved accuracy; the camera on the mobile device and photogrammetry software such as the Pix4D Capture software used here offer a relatively low-cost and low-skill solution for geospatially referenced as-built data collection. Figure 34 presents several other RTK-corrected antennas that can be used with mobile devices.

Figure 33. Utility as-built creation using Vigram viDOC

Figure 34. Examples of RTK-corrected antennas for mobile devices

Notably, these solutions are only applicable for utility as-built data capture with open trench installations. The use of trenchless installation, such as horizontal directional drilling, has been commonly cited as a reason why geospatially referenced utility as-built information is not captured for certain projects. Based on consultations with trenchless technology equipment manufacturers, however, it should be noted that this equipment, especially if manufactured

within the last decade, has the functionality to produce geospatially referenced as-builts using standard equipment features. The more common reason that this information is not collected is that it traditionally has not been requested or a storage location for these data has not been provided. This is an easy area for improvement, where these data could be specifically required as part of a permit.

4.3 Recommendations for Utility Permitting Requirements

In reference to permitting requirements, this research found that there are cases where utility accommodation permits are not required, and even when required, the requirements of these permits may vary substantially. The recommendation from this research is that any utility being installed in the public ROW should require the submission of a permit. Additionally, the requirements of this permit should discuss and detail conditions including the following:

- Traffic control plans
- Installation schedules
- Utility plans/sketches
- Method of installation
- Location details
- Restoration plans
- Insurance certificates
- Performance bonds
- Emergency contacts
- Contractor qualifications

Example permitting language can be found in many locations. It is also recommended that entities review the American Association of State Highway and Transportation Officials (AASHTO) *Guide for Accommodating Utilities within Highways and Freeways* (https://store.transportation.org/Item/CollectionDetail?ID=262) and the Iowa DOT *Utility Accommodation Policy* (https://iowadot.gov/media/140/download?inline=) when developing permit requirements and language. For further reference, the Iowa DOT *Form 810025 - Utility Accommodation Permit (Dated 11/2023)* is provided in Appendix D of this report. Guidance and standardization of permit language is recommended by this research, but future research effort may be warranted to produce such guidance, perhaps as a reference to be hosted by the Iowa SUDAS program.

CHAPTER 5. UTILITY MANAGEMENT BEST PRACTICE TRAINING

According to the findings of this research, and as identified in the initial request for proposals on this research topic, there is a need for training to support and educate local agencies on the range of utility management practices that could be used to improve and bring more standardization to their own practices.

An initial online webinar was offered as informational training through the Iowa Local Technical Assistance Program under Iowa State University's Institute for Transportation. This webinar, titled *Utility Permitting Practices for Public Rights of Way* and delivered on February 20, 2025, was led by Roy Sturgill and summarized this research study. The webinar highlighted utility permitting requirements and the variability of permitting practices in Iowa and presented recommendations for more uniform utility permitting practices across cities, counties, and municipalities to improve efficiency and data uniformity. The recording of this webinar is available at https://iowaltap.iastate.edu/utility-permitting-practices-for-public-rights-of-way-webinar/. The slides used in the webinar are provided in Appendix E of this report.

More detailed training was also developed and delivered as part of this research. The training presented utility permitting requirements and the variability of permitting practices found during the study. The training highlighted effective practices for working toward more uniform utility permitting across cities, counties, and municipalities to improve efficiency and data uniformity. An outline of the training is presented in Figure 35.

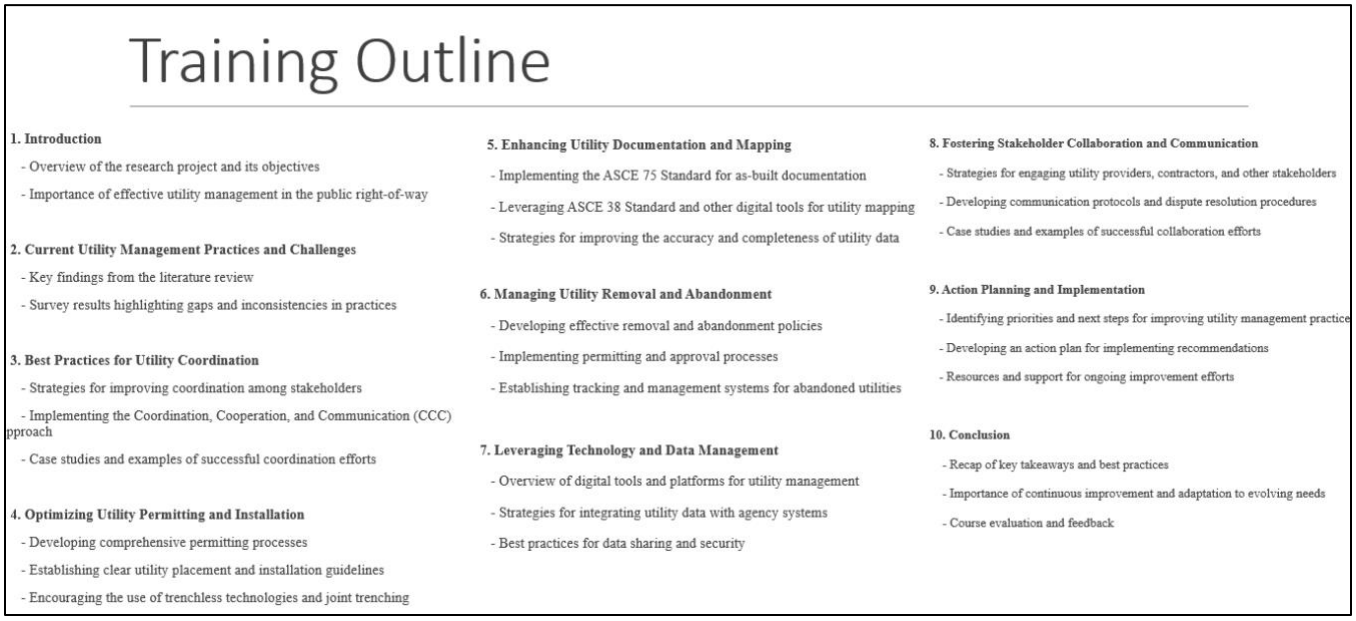


Figure 35. Training outline

The training was considered a half-day session, beginning at 8:30 a.m. and concluding at 12:00 p.m. The dates and locations of the training sessions offered were as follows:

- May 22, 2025 – Iowa DOT District 3 office, Sioux City, Large Conference Room 104AB
- June 5, 2025 – InTrans Research Center, Ames, Training Room 4044
- June 12, 2025 – Iowa DOT District 6 office, Cedar Rapids, Kirkwood Lower Room A

Approximately 90 total attendees completed the training. The attendees included Iowa utility staff, consultants, utility contractors, utility owners, highway contractors, and city and county staff from across Iowa. Attendees evaluated the training after each session, with the feedback providing positive comments and noting that the information covered was highly valuable. A frequent comment regarding improvement of the training was that it should be conducted as a full-day session. The slides for this training are provided in Appendix F of this report.

In discussing the future use of this training, it was determined that the content is indeed more suited to a full-day session. The research team will be working with the TAC chair to revise the training as a one-day session and will plan offerings through Iowa State University's Institute for Transportation. The scheduling and frequency of the training will be coordinated between the research team and the TAC chair.

CHAPTER 6. PROJECT CONCLUSIONS

6.1 Conclusions

The research findings herein highlight areas needing improvement in utility management, such as policy alignment, permitting, documentation, congestion management, abandonment, and restoration. Standardizing effective procedures where lacking could improve transparency, coordination, location data, construction oversight, infrastructure longevity, and public satisfaction. While many agencies have made strides in establishing standard policies and procedures, inconsistencies and gaps remain that highlight a need for statewide standardization, the importance of digital as-built documentation, the potential benefits of utility corridors, the need for improved congestion management, the importance of permitting and installation oversight, the necessity of robust restoration standards, and the need to regulate utility abandonment and status changes. In summary, while some standard policies and practices exist in many agencies, there are key utility management deficiencies that should be addressed through robust, consistent solutions to benefit all stakeholders.

To address these challenges and forge a path toward more efficient, coordinated, and sustainable utility management, transportation agencies must embrace change and adopt a set of comprehensive best practices. The journey begins with standardizing utility definitions and classifications, ensuring that all stakeholders are speaking the same language and working toward common goals. By developing clear, consistent definitions for each utility type and encouraging the adoption of a standardized classification system, agencies can lay the foundation for better coordination, data sharing, and regulatory consistency.

Next, agencies should focus on customizing their utility accommodation policies to align with the unique needs and characteristics of their transportation systems. While the state DOT policy can serve as a guiding light, local adaptations based on factors such as road classification and speed limit will ensure that policies are tailored to the specific demands of each jurisdiction. This customization process should be accompanied by a streamlining of permitting and registration processes, leveraging the power of technology to create comprehensive, centralized utility permitting systems that integrate seamlessly with GIS and asset management platforms. By requiring pre-registration of utility providers, standardizing permit fees, and establishing robust compliance and enforcement programs, agencies can ensure that utility work adheres to the highest standards of quality and safety.

The quest for improved utility management also demands a renewed focus on documentation and data accuracy. Agencies should mandate the submission of detailed, accurate as-built documentation in standardized digital formats such as GIS or CAD, adopting ASCE 75 as a benchmark for excellence. By integrating these data with the agency's GIS and asset management systems, stakeholders can maintain a comprehensive, up-to-date inventory of utility infrastructure, facilitating better decision-making and coordination. In parallel, a transition to GIS-based utility mapping, guided by ASCE 38-22, will further enhance the accuracy and reliability of utility location information.

As agencies work to modernize their data management practices, they must also turn their attention to the development of comprehensive utility installation guidelines. These guidelines should cover all aspects of utility placement, construction, and maintenance within public rights of way, establishing clear criteria for utility locations, approved installation methods, site preparation, and restoration standards. By providing a roadmap for best practices, agencies can ensure that utility work is performed consistently and safely across their jurisdictions.

In the face of increasing congestion and competing demands for limited right of way space, the implementation of utility corridor management strategies becomes paramount. Agencies should develop and implement utility corridor management plans to optimize the use of public rights of way in congested areas, encouraging co-location and shared infrastructure initiatives, establishing corridor mapping and database systems, and exploring joint trenching opportunities. By taking a proactive, collaborative approach to corridor management, agencies can minimize disruptions, maximize efficiency, and ensure the long-term sustainability of both transportation and utility networks.

The journey toward improved utility management also requires a hard look at the end-of-life processes for utility infrastructure. Agencies must establish clear policies and procedures for the removal and abandonment of utility infrastructure, including criteria for when removal is required, standards for safe abandonment in place, and permitting and documentation requirements. By implementing a tracking and management system for abandoned utilities and providing training and outreach to stakeholders, agencies can ensure that the legacy of utility work is properly managed and does not become a burden for future generations.

Finally, the adoption of flexible, performance-based restoration standards will help to ensure the longevity and reliability of restored infrastructure. Agencies should develop customizable utility restoration standards that allow for agency-specific adaptations based on local conditions and needs, encouraging the use of high-quality, durable materials, implementing warranty and liability provisions, and establishing scalable quality assurance and inspection programs. By holding utility providers accountable for the quality and performance of their restoration work, agencies can protect the integrity of their transportation systems and minimize the need for costly repairs and maintenance.

In conclusion, the path to enhanced utility management practices is clear, but it requires a commitment to change, collaboration, and continuous improvement. By embracing the recommendations outlined in this study, transportation agencies across Iowa can take meaningful steps toward a future where utility work is performed efficiently, safely, and sustainably, in harmony with the needs of taxpayers (public) and the built environment.

6.2 Future Research Needs

This research highlighted several gaps regarding utility permitting and accommodation in Iowa. While several recommendations were made as part of the research, there remain areas that could benefit from future research. These areas are highlighted as follows:

1. **Utility as-built guidance**: Research to develop guidance on utility as-built development using the most advanced technologies to limit costs and maximize benefits would assist cities and counties in setting forth efficient and effective practices for requiring and collecting utility as-built information.
2. **Iowa SUDAS guidelines for utility accommodation policies**: Notably, some Iowa municipalities do not have utility accommodation policies in place. Starting these documents can be a daunting task, and assistance in the form of standard language from Iowa SUDAS would be beneficial. A research effort could produce such standard language to be hosted by Iowa SUDAS.
3. **Iowa SUDAS standardized permitting requirements**: Many Iowa municipalities also do not have utility permitting requirements and procedures in place. The development of standardized language and requirements is a recommendation of this research, but achieving such standardization can be difficult unless driven by a centralized program such as Iowa SUDAS. An effort to produce guidance on utility permitting and the standardization of permit language to be hosted by Iowa SUDAS would be of benefit to many Iowa communities.

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APPENDIX A. CONCERNS OR GAPS ABOUT THE ADEQUACY AND EFFECTIVENESS OF CURRENT POLICIES OR STANDARDS FOR UTILITY ACCOMMODATION

What is/are your concerns or gaps?
Removal of abandoned utilities as they are generally left in place and timely relocation of utilities during construction
Utility permitting requirements, utility placement within the right of way
Permit timeline, coordination with CIP projects, restoration, lane closures, core holes
Lack of inspection and gis/data for future reference on where they are located
-Speak more to private utilities such as water lines -Require better permit plans. We allow a hodge podge of any from engineered plans to lines drawn on google maps with lots of wording to describe the utilities intent.
Appropriate locations
n/a
Utilities not proactively working with city's and counties to move utilities.
Utilities do not notify the County Engineer when starting or finishing. They ignore the rules. They damage roads and refuse to fix or pay.
Needs updated, which we are currently working on
Too many utilities for the ROW/easement area available. Utilities not installing thier infrastructure per standards (i.e. too shallow). Utilities not coordinating with City prior to City construction projects (delays during construction). Utilities completing work without permits. Utilities not restoring sites per City standards.

APPENDIX B. MORE TYPES OF LOCATIONAL INFORMATION SUPPLIED BY UTILITY PROVIDERS TYPES

Others (please Specify) - Text
Varies widely by utilty type
Map of location, plan sheets may be included
Usually a general location map, not survey grade accurate.
all depends on the utility

APPENDIX C. STATE AGENCIES SURVEY QUESTIONNAIRE

Iowa Department of Transportation Research Study (SPR 3052): **Best Practices for Utility Management in the Public Right of Way**

As utility companies seek to expand and enhance the services they provide, more utility infrastructure is being located in public rights of way (ROW) as a benefit to the ratepayer, who is also the taxpayer. Utility permit and documentation requirements for utility installations vary considerably throughout the United States. Within Iowa, ROW management of construction and utility activities varies between cities, counties, and the Iowa Department of Transportation (DOT). This variation has led to differing methodologies and unorganized coordination within public agencies on infrastructure projects containing utilities. There is a need for a more standardized utility management approach to control the planning and installation of utilities within public ROW, require documentation of utility as-built plans and location information, and manage this information so it can be useful to future construction efforts. This study intends to identify policies to enforce proper installation and documentation of utilities in public ROW.

The primary objectives of this study are as follows:

- Create a documented process across agencies for project coordination and management of the rights of way, including utility locating, permitting requirements, ordinances, installation methods, and capacity requirements that allow for future flexibility
- Undertake a series of technology transfer activities—including conference presentations, in-person training, and an online training course—that showcases the main objective.

This survey seeks to collect current practices for managing utilities among city, county, and state agencies. It is anticipated that this survey will take approximately 20-25 minutes to complete.

Your response is very important to this effort. Should you have any questions, please contact Roy Sturgill at Iowa State University, sturgill@iastate.edu, 515-294-3933.

Questions

Please complete your information below. (Your identifying information will not be reported within this study, but used for categorizing the response [city, county, state] and if we need to follow up with you.)

○ Name: _____

○ Title: _____

○ Agency (City, County, etc): _____

○ Phone: _____

○ Email: _____

Q1. Which of the following are considered Utilities by your agency? (Select all that apply)

- ☐ Water
- ☐ Sanitary Sewer
- ☐ Gas
- ☐ Electric
- ☐ Telecommunications / Fiber
- ☐ Oil & Gas
- ☐ Petroleum
- ☐ Irrigation Lines
- ☐ Others (Please specify) _____

Permitting, Requirement, and Accommodation

Q2. Does your agency have a standard accommodation policy for utility placement along ROW?

- ○ Yes
- ○ No

Q2.1. Please describe or perhaps provide a website link:

_____

Q2.2. or upload related documents

Q3. Are your current policies or standards for utility accommodation adequate or effective?

○ Yes

○ No

Q3.1. What is/are your concerns or gaps?

_____

Q4. Does your agency policy or standard reference the Iowa DOT "POLICY FOR ACCOMMODATING AND ADJUSTMENT OF UTILITIES ON THE PRIMARY ROAD SYSTEM"?

○ Yes

○ No

Permitting, Requirement, and Accommodation

Q5. Does your agency require any Utility/ROW permit or agreement for the accommodation of utility installations?

○ Yes

○ No

Q6. Does your agency charge accommodation fees for utility installations?

○ Yes

○ No

Q6.1. Please upload a copy of your agency's utility installation permit or agreement

Q7. Does your agency require utility providers to register (e.g. company information, proof of insurance etc.) prior to, or as part of, submitting a permit application?

○ Yes

○ No

Q7.1. Please provide a copy of your agency's utility permit or provider registration form

Q8. Does your agency require a permit or agreement for utility improvement/adjustment/relocation /or maintenance?

- ○ Yes
- ○ No

Q8.1. Please upload a copy of your agency's utility improvements/maintenance permit form or agreement

Q9. What permits are required for utility installation/maintenance? (Check all that apply.)

- ☐ Access Permit
- ☐ Utility Permit
- ☐ Excavation/Grading Permit
- ☐ Obstruction Permit
- ☐ Right-of-way Permit
- ☐ Landscaping Permit
- ☐ Other (Please specify) _____

Q10.1 What information is required as part of a utility permit?

- ☐ Traffic Control Plan
- ☐ Schedule
- ☐ Utility Plans/Sketch
- ☐ Method of Installation
- ☐ Location Information

☐ Restoration Plan

☐ Other _____

Q11. Are utility providers required to survey/locate their utilities after installation?

○ Yes

○ No

Q12. Does your agency require as-builts after utility installation?

○ Yes

○ No

Q13. Does your agency receive as-builts after installation?

○ Yes

○ No

Q13.1. How long, on average, does it take to receive as-builts after utilities have been installed? Please provide your response in months

_____

Q13.2. Of the as-builts received, what percentage were received only after more than one request to the provider?

_____

Location Factors

Q14. What type of locational information is supplied by utility providers?

☐ Map locational information

☐ As specified by our agency

☐ Based on project

☐ GIS data/GPS coordinated data

☐ Text-only written descriptions

☐ CAD data

☐ Others (please Specify) _____

☐ None

Q15. What type of information are field locations based on?

☐ Distance from the centerline of public ROW

☐ Distance from the curb line

☐ Offset distance from property lines

☐ Others (please specify) _____

Q16. Is there a guideline for where certain utilities are to be located? [Examples derived from "Des Moines Metropolitan Design Standard" a.) Telephone, cable TV, and water are to be on the east and south side of the road, b.) Watermains, Valves, and Hydrants location are 4' back of curb c.) Recommended bury for electric cable is 4', etc.]

○ Yes

○ No

Q16.1. Please provide more details or attach related documents regarding guidance for utility locations.

- ○ Water _____
- ○ Sanitary Sewer _____
- ○ Gas _____
- ○ Electric _____
- ○ Telecommunications / Fiber _____
- ○ Oil & Gas _____
- ○ Petroleum _____
- ○ Irrigation Lines _____
- ○ Others _____

Q16.1.1. Upload utility location guidance documents

Installation Method

Q17. Do you dictate or approve the installation methods for underground utilities?

- ○ Yes
- ○ No

Q18. What method(s) of installation do you allow for underground utilities?

- ☐ Directional Boring
- ☐ Open Trench
- ☐ Jacking
- ☐ Hand Dig

☐ Direct bury

☐ Core drill

☐ Others (please specify) _____

Q19. Do you have standard required information for installing utilities?

Aboveground Utility(e.g., linear feet, if attached to a bridge)	○ Yes	○ No
Underground Utility (e.g., depth of conduct, methods of installation)	○ Yes	○ No

Q19.1 Please provide details regarding these standards

○ Aboveground Utility _____

○ Underground Utility _____

Q19.1.1 or upload related documents

Q20. Do you require or encourage co-location of utilities?

○ Yes

○ No

Capacity/ROW Management

Q21. Does your agency utilize the concept of a Utility Corridor planning to accommodate various types of utilities within its right of way?

○ Yes

○ No

Q21.1 Do you use different terminology (other than utility corridors) to describe the use of Utility Corridors?

○ Yes

○ No

Q22. Do you have a Utility Corridor Policy that is either a stand-alone policy or part of a larger Utility Accommodation Policy that governs the usage of utility corridor structures?

○ Yes

○ No

Q23. Does your agency have a process for working in a congested roadway areas?

○ Yes

○ No

Q23.1. Please describe your process for working in congested roadway areas.

_____

Q23.1.1 or upload related document

Q23.2. Are co-locates required as part of working in congested corridors?

○ Yes

○ No

Q24. Does your agency install its own conduits (ducts) and lease them to utility providers?

○ Yes

○ No

Q24.1. Do you charge fees to utility providers to lease your conduits (ducts)?

○ Yes

○ No

Q24.2. Would you like to consider leasing of your own conduits/ducts in the future?

○ Yes

○ No

Maintenance and Operations of the Facility

Q25. Do you have a process defined to change the status and ownership of a utility or remove a utility if it is out of service?

○ Yes

○ No

Q26. Do you have a process or permit for removing abandoned facilities?

○ Yes

○ No

Q27. Do you allow the status of a utility to change for another function (e.g., a water line becomes a conduit for fiber)?

○ Yes

○ No

Q28. Does your agency have a standard procedure/requirement for the repair of utility cuts in pavement associated utility installations or maintenance?

○ Yes

○ No

Q28.1. Please describe the type of repair and restoration, (i.e. backfill, compaction, and quality control system for repair works)

_____

Q28.2. Does your procedure provide satisfactory results?

○ Yes

○ No

Q29. Is there a contract and defect liability period for road restorations as a result of damage by utility work?

- ○ Yes
- ○ No

Q30. Do you have any bonding or liability insurance requirements of utilities working/installing in your ROW?

- ○ Yes
- ○ No

Q31. Please provide any additional information you believe would be useful to our study.

Q31.1 Please provide any additional websites/links you believe would be useful to our study.

_____

APPENDIX D. IOWA DOT UTILITY PERMIT FORM 11/2023

IOWA DOT
Form 810025 (11-23)

APPLICATION AND AGREEMENT FOR USE OF HIGHWAY RIGHT-OF-WAY FOR UTILITIES ACCOMMODATION

FOR DEPARTMENT USE ONLY

Permit Number	Highway Number	County
DOT Project Number		Expiration/Completion Date

APPLICANT (INDIVIDUAL OR COMPANY)

First Name	Middle Initial	Last Name	Phone Number	Ext.
Company Name			Phone Number	Ext.

Street Address	City/Town	State	ZIP Code

e-Mail Address	Secondary e-Mail Address

INSTALLATION TO BE ACCOMMODATED
Approval is hereby requested to enter within the state highway right-of-way for the accommodation of a utility installation as detailed on the attachments and further described as follows.

The installation shall consist of:

and shall be located as shown on the detailed plan attached hereto. **(See current Iowa Department of Transportation Utility Accommodation Policy for submittal of detailed plan requirements.** See Section 115.8 (3).) https://iowadot.gov/rightofway/pdfs/UtilityPolicy.pdf

WORK SITE LOCATION

The proposed work as described above is located in Section _____ , Twp. _____ ,

Range _____ on Highway No. _____ generally located _____ (miles) _____

(direction) from _____ (city, county line, or other landmark).Work proposed is more

specifically located as being from _____ (Milepost #) and _____ (Highway Station)

to _____ (Milepost #) and _____ (Highway Station) on the _____ side of highway.

Disclosure Statement: The information furnished on this form will be used by the Department of Transportation to determine approval or denial of the application. Failure to provide all pertinent information will result in denial of the application. Information furnished is public information and copies may be provided to the public upon request.

The utility company, corporation, applicant, permit holder or licensee, (hereinafter referred to as the Permit applicant) agrees with the Iowa Department of Transportation (hereafter referred to as the Department) that the following stipulations and those special requirements as listed on this document shall govern under this permit after it is approved by the Department.

A. General

1. The installation shall meet the requirements of local municipal, county, state, and federal franchise rules and regulations, regulations and directives of the Iowa State Commerce Commission; the Iowa Department of Natural Resources, all rules and regulations of the Department and any other laws or regulations applicable.
2. The Permit Holder shall be fully responsible for any future adjustments of the facilities within the established highway right-of-way caused by highway construction or maintenance operations.
3. As per Section 115.8(8) of the Utility Accommodation Policy, As-Built plans are due within 90 days after completion of construction, the utility owner shall submit to the district representative an as-built plan.
4. The work described in this permit shall be completed as proposed in compliance with the stipulations and special requirements within one year from the date Department approval is received for said request. Failure on the part of the Permit Holder to abide by the stipulations or in constructing the work described as stipulated and within the time frame stated shall render this agreement and request null and void. The Permit Holder also agrees to save the State of Iowa and the Department harmless of any damages or losses that may be sustained by any person, or persons, on account of the conditions and requirements of this agreement.
5. Non-compliance with any of the terms of the Department's policy, permit, or agreement, may be considered cause for shut-down of construction operations, revocation of the permit, or withholding of relocation reimbursement and/or withholding of future application approvals until compliance is confirmed. The cost of any work deemed necessary to be performed by the State in removal of non-complying construction will be assessed against the Permit Holder.

Page 1 of 4

B. Construction and Maintenance

1. The location, construction and maintenance of the utility installation covered by this application shall be in accordance with the current Department's Utility Accommodation Policy. https://iowadot.gov/rightofway/pdfs/UtilityPolicy.pdf

2. Before beginning any work in the highway right-of-way, it is the responsibility of the Permit Holder to obtain an easement from the drainage district if necessary. The Department assumes no responsibility for advising the Permit Holder of each location of a drainage district crossing. It is the Permit Holder's responsibility to locate these crossings and obtain any necessary easements or permission from the drainage district. See Code of Iowa, Chapter 468 for additional information.

3. A copy of the approved permit shall be available on the job site at all times for examination by Department personnel.

4. Operations in the construction and maintenance of this utility installation shall be carried on in such a manner as to cause minimum interference to or distraction of traffic on said highway.

5. Traffic protection shall minimally be in accordance with Part VI of the current Manual on Uniform Traffic Control Devices for Streets and Highways. The applicant shall be responsible for correctly using traffic control devices including signs, warning lights, and channelizing devices as needed while work is in progress or the clear zone is impacted. Flagging operations are the responsibility of the applicant. The Department's TC XXX Series Standards are the preferred traffic control specification plans.
http://www.iowadot.gov/design/stdplne_tc.htm

6. The applicant shall seed and mulch all disturbed areas within the highway right-of-way and shall be responsible for the vegetative cover until it becomes well established. Any surfaced areas such as driveways or shoulders and sodded waterways and plantings which are disturbed shall be restored to their original condition. Any damage to any other underground facilities during installation shall be repaired at the permit holder's expense.

7. All personnel in the highway right-of-way shall wear ANSI 107 Class 2 apparel at all times when exposed to traffic or construction equipment.

8. As per Policy Section 115.4(9) parking or storage in the clear zone is prohibited. When not in actual use, vehicles, equipment and materials shall not be parked or stored within the clear zone or median.

9. Unless specifically noted in Special Requirements section, all work performed within the right-of-way shall be restricted to 30 minutes after sunrise to 30 minutes before sunset.

10. Pedestals shall be placed within 12 inches of the right-of-way line.

11. All above and below ground appurtenances (pedestals, hydrants, drains, accesses, etc.) shall be marked with high visibility posts and signs. The minimum height requirement for the signs shall be 5 foot. Urban Roadway Sections may be exempted with department approval.

C. Liability

1. To the extent allowable by law, the Permit Holder agrees to indemnify, defend, and hold the Department harmless from any action or liability arising out of the design, construction, maintenance, placement of traffic control devices, inspection, or use of the Permit Holder's facilities. This agreement to indemnify, defend, and hold harmless applies to all aspects of the Department's application review and approval process, plan and construction reviews, and funding participation.

2. The Permit Holder shall indemnify and save harmless the State of Iowa, its agencies and employees, from any and all causes of action, suits at law or in equity, for losses, damages, claims or demands, and from any and all liability and expense of whatsoever nature, arising out of or in connection with the Permit Holder's use or occupancy of the public highway.

3. The State of Iowa and the Department assume no responsibility for damages to the Permit Holder's property occasioned by any construction or maintenance operations on said highway if the facilities are not located in accordance with this permit.

4. The State of Iowa, its agencies or employees, will be liable for expense incurred by the Permit Holder in its use and occupancy of the highway right-of-way only when negligence of the State, its agencies or employees, is the sole proximate cause of such expense. Whether in contract, tort or otherwise, the liability of the State, its agencies and employees, is limited to the reasonable, direct expense to repair damaged utilities, and in no event will such liability extend to loss of profits or business, indirect, special, consequential or incidental damages.

D. Notification

1. The Permit Holder is responsible for contacting **Iowa One-Call (1-800-292-8989)** and request the location of all underground utilities forty-eight (48) hours before excavation. Before beginning work in the highway right-of-way, the Permit Holder shall also contact any other known utility located in the area of the proposed work.

2. The Permit Holder agrees to give the Department forty-eight (48) hour notice of its intention to start construction or to perform routine maintenance on the highway right-of-way. Said notice shall be made to the local DOT contact person whose name is shown on Page 3.

3. **511 Notification** - The Permit Holder or their contractor **may not obstruct or close** primary highways or primary highway extensions (state highways within city limits) **without prior consent of the department**, except in emergency situations. Before setting up a lane closure or vertical/horizontal restriction of any kind on a primary highway, call the local DOT Maintenance Garage **AND** the Traffic Management Center per attached documents. Except in emergency situations, a 10-day advance notice is required.
http://www.iowadot.gov/traffic/utility/pdfs/511UtilityNotification.pdf

E. Buy America

Buy America applies to relocations of utility facilities that must move due to highway projects under certain specific conditions that include reimbursable locations and relocations due to interstate projects.
Please contact the Department's District Engineering Operation Technician (EOT) for more information on Buy America requirements or visit the following link: https://iowadot.gov/rightofway/Utility-Accommodation-and-Coordination#533652456-buy-america

Permit Number:_____

FOR DEPARTMENT USE ONLY

Special Requirements - in addition to the stipulations above, the following special requirements shall apply to this permit:

Applicant Signature and Agreement

The undersigned have read the stipulations of this permit agreement as stated, as well as attachments which may be included, and by signing this application agree to abide by all stipulations and to complete the work as proposed in compliance with the stipulations and attachments within one year from the date Department approval is granted for said request. Failure on the part of the applicant to abide by the stipulations or to construct the work desired as stipulated and within the time frame stated shall render this agreement and request null and void. The undersigned also agrees to save harmless the State of Iowa and the Iowa Department of Transportation from any damage or losses that may be sustained by any person or persons on account of the conditions and requirements of this agreement.

Name of Agent *(Print or Type)*	Agent/Owner *(Signature)*	Title
Name of Owner *(Print or Type)*		Date
e-Mail Address		

CITY ACTION (IF PROPOSED WORK IS WITHIN AN INCORPORATED CITY, CITY ACTION IS REQUIRED)

"The undersigned city joins in the grants embodied in the above permit executed by the Iowa Department of Transportation on condition that all of the covenants and undertakings therein running to the Iowa Department of Transportation shall inure to the benefit of the undersigned city and recommends action on said permit application as noted below by the delegated city official".

☐ **Recommend Approval** ☐ **Do Not Recommend Approval** ☐ **None Required**

Signature	Title	Date
Type or Print Name	Authorized Official for the City of	
e-Mail Address		

COUNTY ACTION (IF PROPOSED WORK CROSSES COUNTY RIGHT-OF-WAY, COUNTY ACTION IS REQUIRED)

"The undersigned county joins in the grants embodied in the above permit executed by the Iowa Department of Transportation on condition that all of the covenants and undertakings therein running to the Iowa Department of Transportation shall inure to the benefit of the undersigned county and recommends action on said permit application as noted below by the delegated county official".

☐ **Recommend Approval** ☐ **Do Not Recommend Approval** ☐ **None Required**

Signature	Title	Date
Type or Print Name	Authorized Official for the County of	
e-Mail Address		

FEDERAL HIGHWAY ADMINISTRATION ACTION (WHEN REQUIRED)

☐ **Recommend Approval** ☐ **Do Not Recommend Approval** ☐ **None Required**

Authorized FHWA Representative Signature	Date

DEPARTMENT OF TRANSPORTATION FINAL ACTION

☐ **Application Approved** ☐ **Application Denied** Permit Number:

Authorized Highway District Representative	Signature	Date
e-Mail Address		

Notice of intention to commence activities on the highway rights-of-way shall be submitted by the applicant a minimum of 48 hours prior to actually commencing the activities as herein granted by this approved application. Notice is to be given to the following Iowa Department of Transportation representative. Except in emergencies a 10 day advance notice is required for lane restrictions of any kind:

Local DOT Contact Person (Type or Print Name)		Phone Number	
Street Address	City/Town	State IA	ZIP Code
e-Mail Address	Permit Number: _____		

Site Plan & Attachments Checklist for Utilities Accommodation Permit

Last updated 10-30-2023

- ☐ Plans showing highway centerline, route number, stationing and milepost.
- ☐ Visible orientation (north arrow) and identifying landmarks.
- ☐ Clearly identify right-of-way (ROW) lines and include with horizontal distance from highway centerline shown, including all breakpoints and changes in the ROW distances.
- ☐ Provide Iowa One Call design request information (minimally the list of utility owners).
- ☐ List all the existing utilities in the installation area. Describe how your installation will address existing utilities that are in conflict, and show all observable existing features, such as power poles, pedestals, markers, handholes, trees, etc.
- ☐ Show all construction features/bore pits with the running line and horizontal distance from roadway edge or centerline (showing clear zone compliance). https://iowadot.gov/rightofway/pdfs/UtilityPolicy.pdf
- ☐ Show the start/stop stationing and depths or elevations for all bores, longitudinal and transverse.
- ☐ Show the start/stop stationing and depths or elevations for all plowing locations.
- ☐ Show casing start/stop locations, lengths, diameter, and material if casings are used.
- ☐ Show all facilities that are to be installed on the site plan including but not limited to pedestals, wire conduit, poles, guy anchors, junction boxes, handholes and manholes. ALL MUST BE REFERENCED BY highway stationing and distance from centerline.
- ☐ Show where installation starts and stops, leave the ROW, stops at existing pedestal, pole, etc. Use highway stationing and distance from centerline of the start and stops.
- ☐ Identify any physical focal points, posts, pedestals, shutoffs, overflow valves, hydrants, etc.
- ☐ Describe any other work to accomplish installation before, during or after installation, including but not limited to removal of brush/trees, removal of underbuild, construction of access, fence removal, fence replacement, etc.
- ☐ Identify unusual issues to be pointed out on the site plan. CLARITY IS THE KEY. It will not be assumed to be included in the permit or that the permit holder will perform certain work if it is not included in the plan.

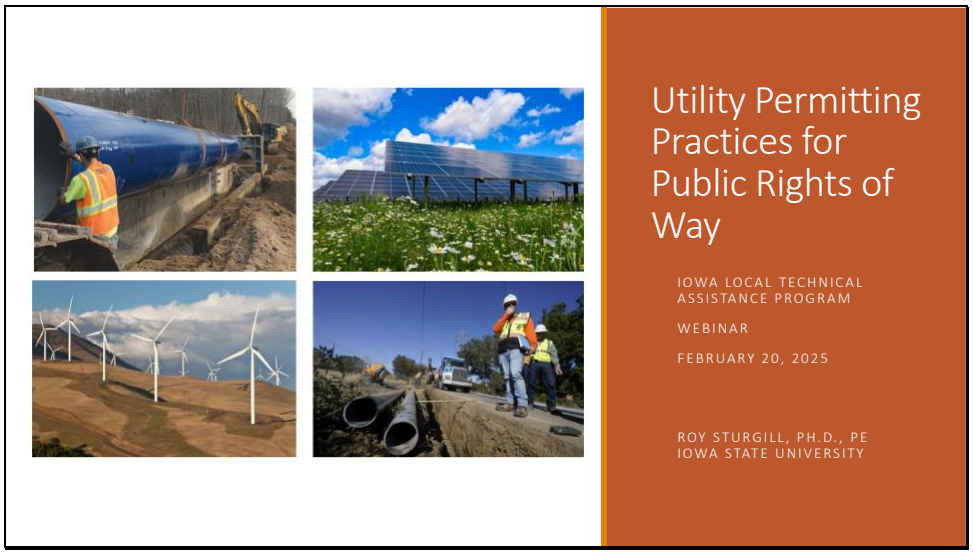
Attachments

- ☐ Proper Traffic Control Standards (Iowa DOT TCxxx Series Standard plans preferred) Available at: http://iowadot.gov/design/stdplne_tc.htm
- ☐ Required Height / Depth Typical (supplied by the department)
- ☐ Tile Repair Guide (rural locations) (supplied by the department)
- ☐ Special Seeding Requirements and Erosion Control (supplied by the department)
- ☐ 511 Lane Restriction Requirements (if any lane restriction is anticipated) (supplied by the department)

ALL ITEMS MUST BE LEGIBLE FOR REVIEW BY THE DEPARTMENT

APPENDIX E. PRESENTATION SLIDES FOR WEBINAR TRAINING DELIVERED

Slide 1



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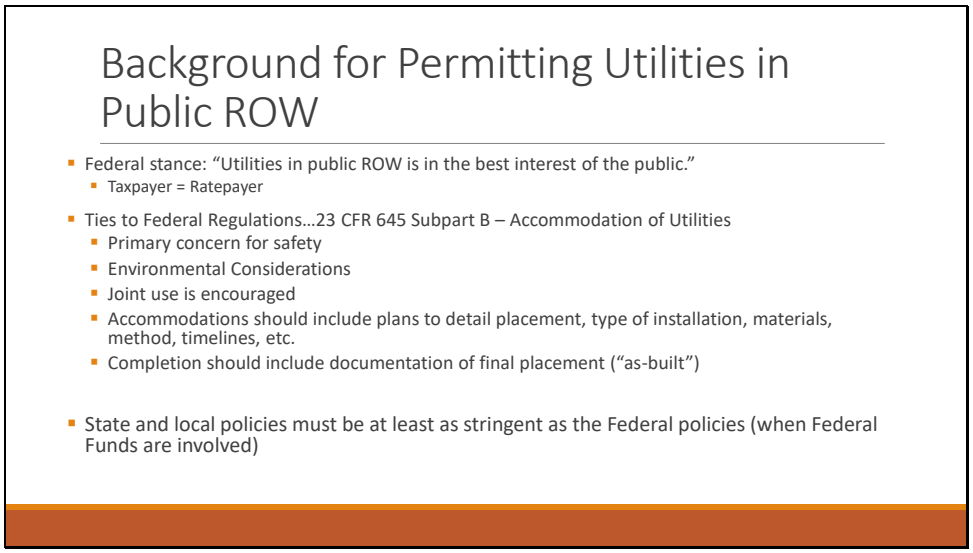


Slide 3

Best Practices for Utility Management in the Public Right of Way

PROJECT NUMBER: IOWA DOT SPR-RE22(011)-8H-00

ROY STURGILL, IOWA STATE
JEREMIAH ADEBIYI, IOWA STATE
JIM ANSPACH, IOWA STATE
JESSE COOPER, HDR

Slide 4

Introduction & Project Coordination

Project Team:

- Roy Sturgill, Iowa State
- Jeremiah Adebiyi, Iowa State
- Jim Anspach, Iowa State
- Jesse Cooper, HDR

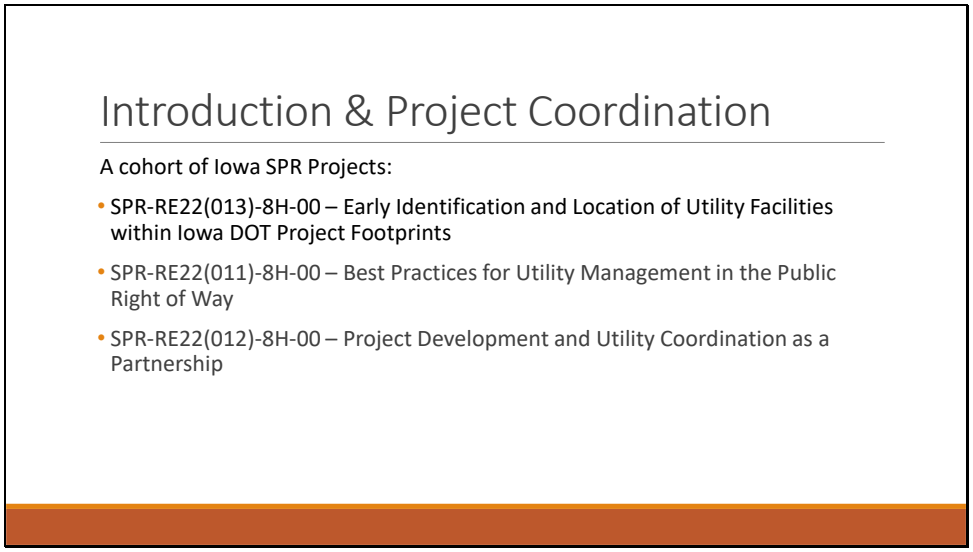
TAC:

- Deanne Popp (Champion), Iowa DOT
- Jon Dienst, Dubuque
- Paul Geilenfeldt, Marshall County
- Brad Hofer, Iowa DOT
- Gabriel Nelson, Snyder & Associates

TAC (cont.):

- Kyle Clute, Iowa DOT
- Jason Havel, Iowa City
- Terra Ray, Cedar Rapids
- John Dostart, Altoona
- Amy Quartell, Ankeny
- William Rabenberg, Clay County
- Doug Miller, Kossuth County
- Brian Moore, Iowa County Engineers Assoc.
- Paul Wiegand, SUDAS/Iowa State

Slide 5



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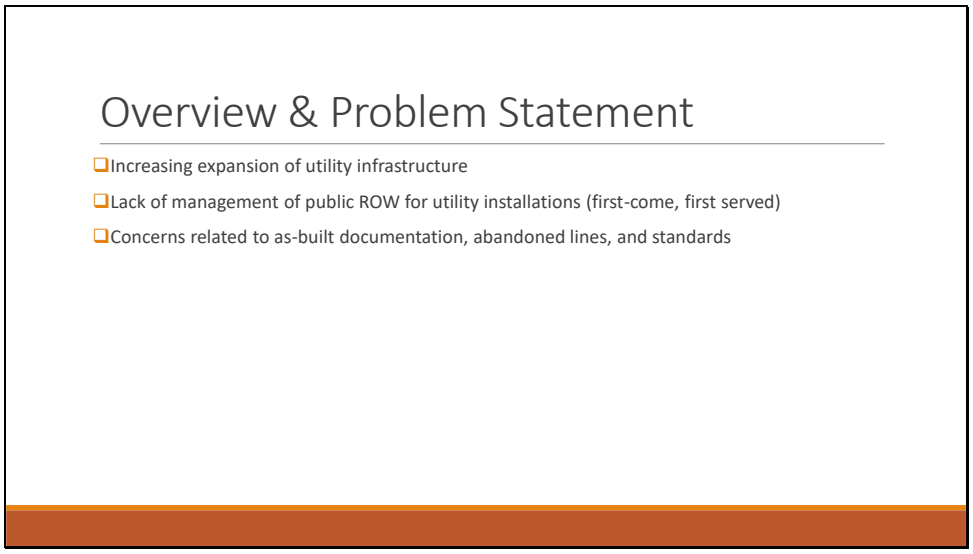

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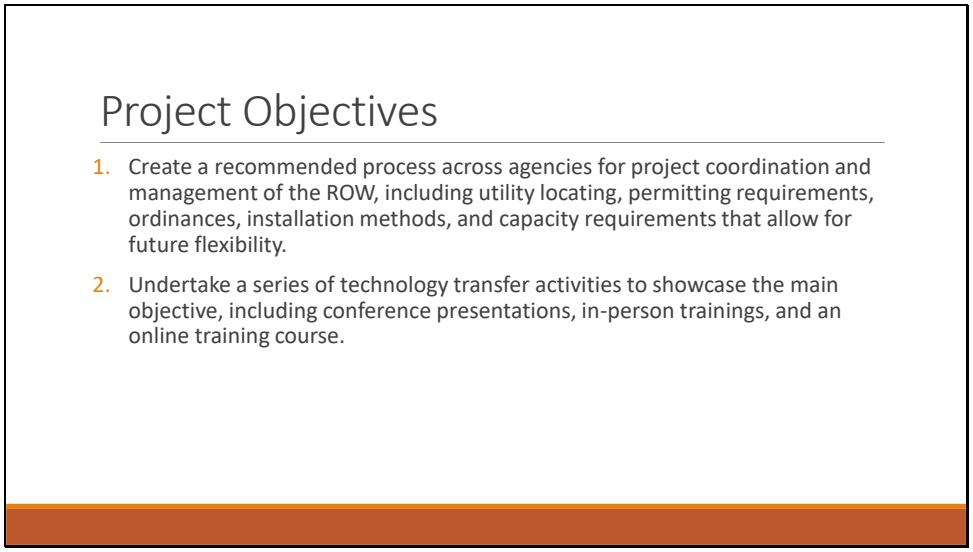

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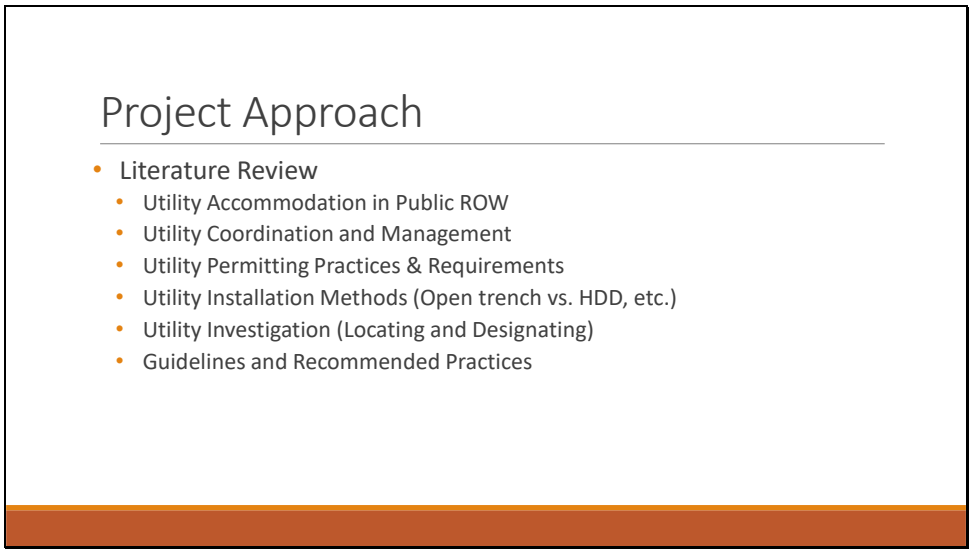


Slide 9

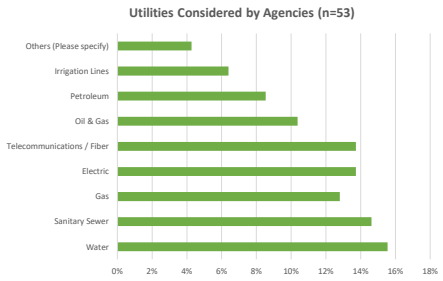
Project Approach

- Survey of City, County, and State Officials in Iowa
  - 53 responses received
  - Topics Included:
    - Definition of Utilities
    - Standard Accommodation Practices
    - Permitted Installations
    - As-built Requirements & Locations/Mapping
    - Installation & Restoration
    - Removal & Abandonment
- Review of Permitting by Larger Iowa Cities
- Discussions with Subject Matter Experts

Slide 10

Findings: Survey

Definition of a Utility



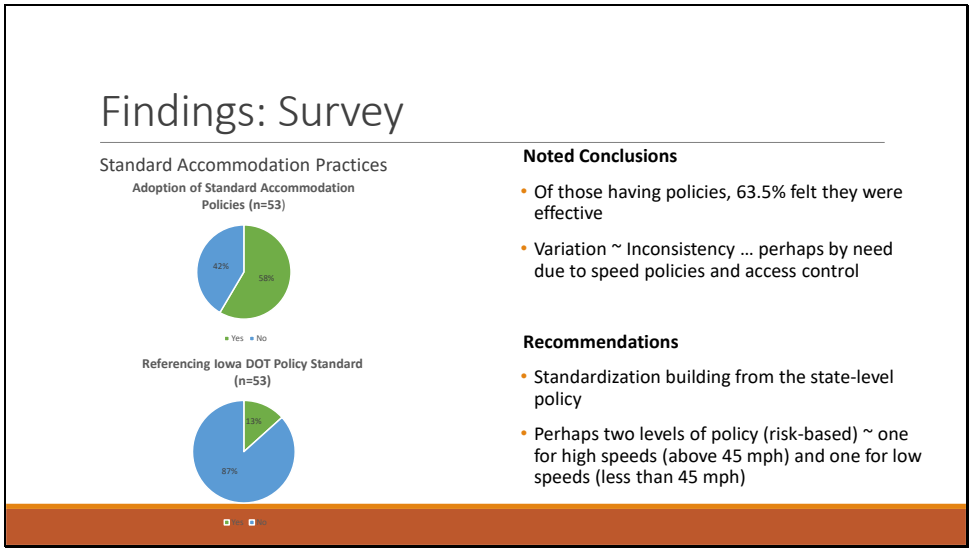
Noted Conclusions

- Storm water highlighted by 9 respondents in "Other"
- Variation ~ Inconsistency

Recommendations

- Standardization statewide will help build consistency ~in policies and practice
- Distinguishing between public and private utilities may affect regulation and approaches

Slide 11



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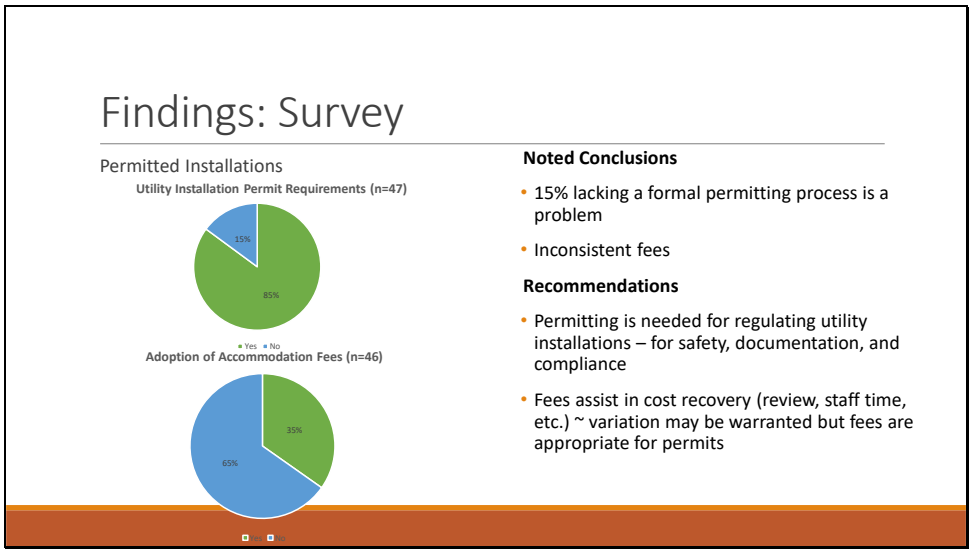
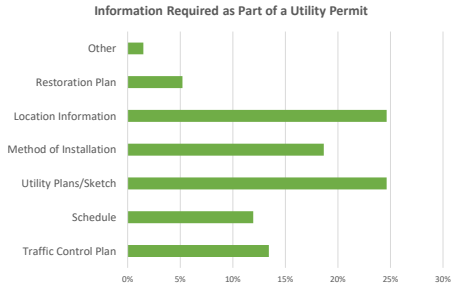


Slide 13

Findings: Survey

Permitted Installations



Noted Conclusions

- 32% do not require proof of insurance or registration to work in ROW
- Various types of permits may be required, and various information requirements

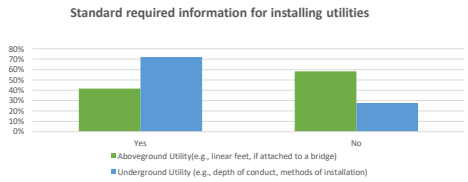
Recommendations

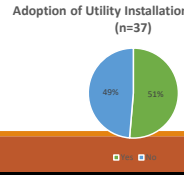
- Permitting allows for oversight, safety, documentation, coordination, traffic control plans, and cost recovery
- Comprehensive and standard permitting helps to protect the public and present consistent expectations of the utility companies

Slide 14

Findings: Survey

Installation & Restoration





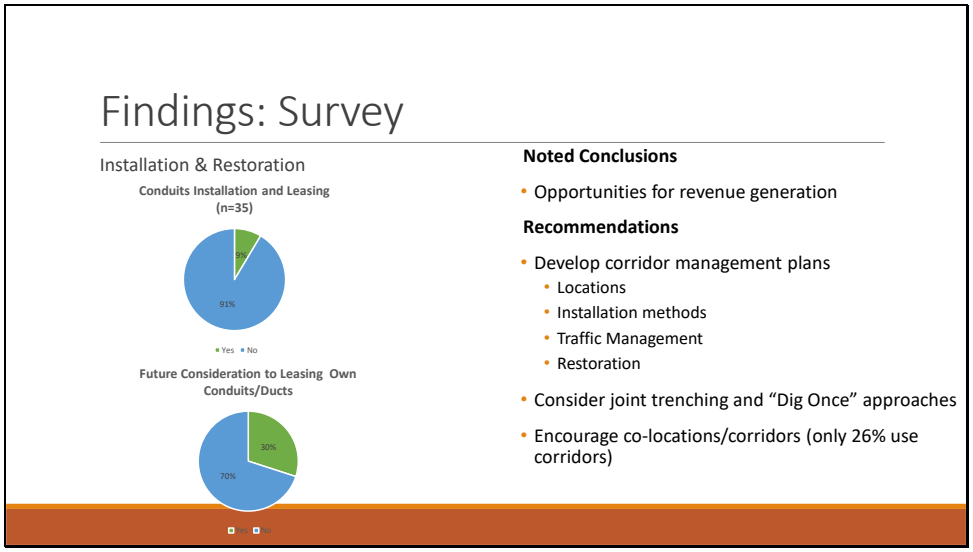
Noted Conclusions

- Inconsistent installation guidelines
- Allowable installation methods vary
- Installation guidelines help to control damage to existing facilities

Recommendations

- Consistent installation guidelines for utility placement, construction, and maintenance; controlling installation method limits damages
- Placement and installation criteria can build consistency for the city and utilities
- Need consistent restoration requirements

Slide 15



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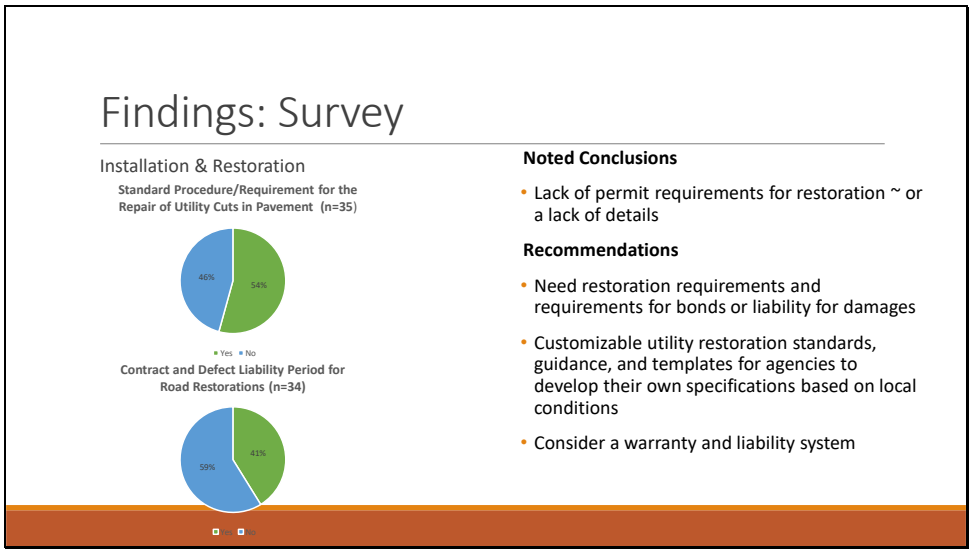

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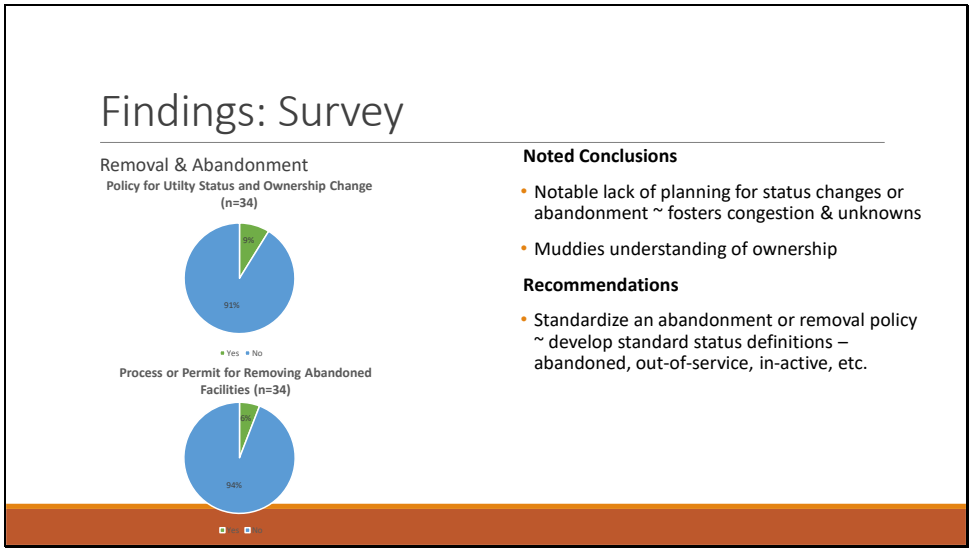

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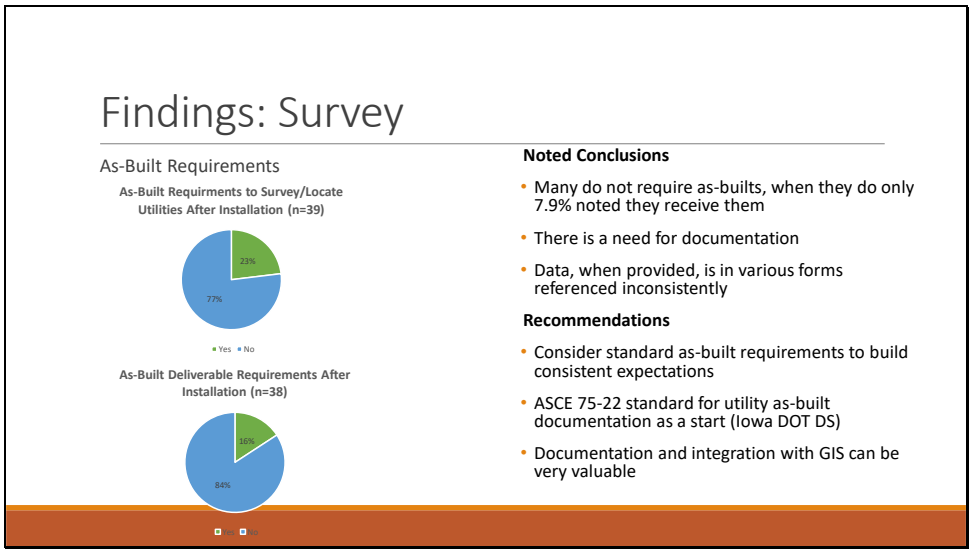


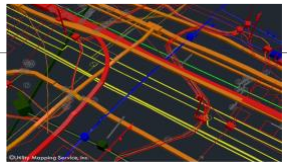
Slide 19

This is a changing landscape…

Slide 20

NCHRP 20-07 Task 418

An Impact and Value Analysis of Requiring Geospatial Locations for Utility Installation As-Builts



Estimated annual savings of having digital/geospatially accurate utility as-builts:

- $250,000,000 in damage prevention annually
- $384,000,000 in reduction of needed SUE services annually

Slide 21

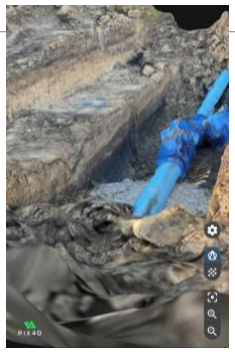
NCHRP Synthesis 20-05 Topic 53-04 *Practices for the Collection, Use, and Management of Utility As-Built Information*

- A majority of DOTs do not receive true utility as-builts
- A handful have implemented electronic systems for collecting the data and require as-builts
- Rapidly changing landscape
- Range of solutions available

PointMan System

Slide 22

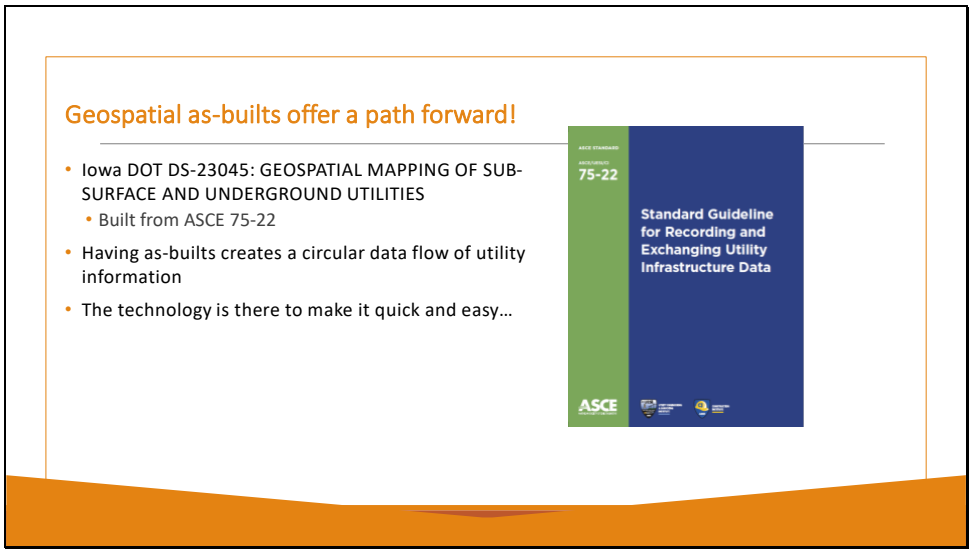
Example: As-builting made easy…



- Full model, instead of a few points…
  - How long did it take?
  - Accuracy: 0.033’

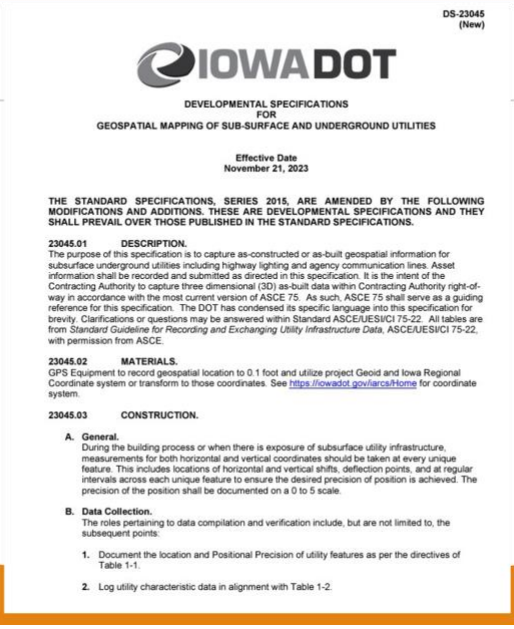
Slide 23

Slide 24



Slide 25

Iowa DOT DS -23045



DS-23045
(New)

IOWA DOT

DEVELOPMENTAL SPECIFICATIONS
FOR
GEOSPATIAL MAPPING OF SUB-SURFACE AND UNDERGROUND UTILITIES

Effective Date
November 21, 2023

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

23045.01 DESCRIPTION.
The purpose of this specification is to capture as-constructed or as-built geospatial information for subsurface underground utilities including highway lighting and agency communication lines. Asset information shall be recorded and submitted as directed in this specification. It is the intent of the Contracting Authority to capture three dimensional (3D) as-built data within Contracting Authority right-of-way in accordance with the most current version of ASCE 75. As such, ASCE 75 shall serve as a guiding reference for this specification. The DOT has condensed its specific language into this specification for brevity. Clarifications or questions may be answered within Standard ASCE/UESI/CI 75-22. All tables are from *Standard Guideline for Recording and Exchanging Utility Infrastructure Data*, ASCE/UESI/CI 75-22, with permission from ASCE.

23045.02 MATERIALS.
GPS Equipment to record geospatial location to 0.1 foot and utilize project Geoid and Iowa Regional Coordinate system or transform to those coordinates. See https://iowadot.gov/iarcs/Home for coordinate system.

23045.03 CONSTRUCTION.

A. General.
During the building process or when there is exposure of subsurface utility infrastructure, measurements for both horizontal and vertical coordinates should be taken at every unique feature. This includes locations of horizontal and vertical shifts, deflection points, and at regular intervals across each unique feature to ensure the desired precision of position is achieved. The precision of the position shall be documented on a 0 to 5 scale.

B. Data Collection.
The roles pertaining to data compilation and verification include, but are not limited to, the subsequent points:

1. Document the location and Positional Precision of utility features as per the directives of Table 1-1.
2. Log utility characteristic data in alignment with Table 1-2.

Slide 26

Iowa DOT DS -23045

H. Deliverables.

1. The data structure of all deliverables shall adhere to standardized field names, domain values, and depicted geometries, as shown in the Utility Layers Schema or enable direct mapping to the same. Geospatial shapefile (.SHP) with all corresponding files including the .PRJ file with coordinate information assigned, submitted to DOT-utilitydata@iowadot.us. A geodatabase template file may also be requested from DOT-utilitydata@iowadot.us.

2. ESRI Shapefiles or geodatabase are preferred, but alternative filetypes that are acceptable are: 2D and 3D Computer-Aided Design (CAD) files or design (DGN) refer to Chapter 40B-1 of the design manual Feature Codes – Full Descriptions (iowadot.gov), Comma-Separated Value (CSV) files, Building Information Modeling (BIM) files, Extensible Markup Language (XML) files, JavaScript Object Notation (JSON) files, Geographic Information System (GIS) files, Graphic Markup Language (GML) Files, Relational Database Records, Spreadsheet files, and Web Feature Services (WFS).

Table 23045.03-1. Levels of Positional Accuracy.

Accuracy Level	Accuracy (Customary Units)	Accuracy (SI Units)
Level 1	0.1 foot	25 millimeters
Level 2	0.2 feet	50 millimeters
Level 3	0.3 feet	100 millimeters
Level 4	1 foot	300 millimeters
Level 5	3 feet	1,000 millimeters
Level 0	Undefined	Undefined

Slide 27

Cities	ROW Permitting system
Ames	ROWay
Ankeny	
Bettendorf	
Cedar Falls	CF1Stop
Cedar Rapid	My CR
Council Bluffs	Paper form
Davenport	Paper form
Des Moines	Paper form
Dubuque	ROWay
Iowa City	CSS Portal
Marion	eSuite
Sioux	Form
Urbandale	Form
Waterloo	Form
West Des Moines	SharePoint

Back to the Findings: Review of Permitting by Larger Iowa Cities

Slide 28

Overall Challenges Discovered

- Inconsistent policies and coordination between state and local agencies as well as with utility providers.
- Very few agencies align policies with statewide DOT standards.
- Permitting and registration requirements are still lacking for 15-30% of agencies, enabling unregulated utility installations.
- Severe gaps exist in as-built documentation and mapping of newly installed utilities, causing uncertainties in location data.
- Around half of agencies lack adequate utility installation location guidelines and method oversight.
- Formal planning policies are rare for utility corridors and congested rights-of-way, leading to conflicts and inefficiencies.
- Removal of abandoned utilities or changing utility status is largely unregulated, resulting in inaccuracies and congestion over time.
- Restoration standards and defect warranty periods necessary to ensure quality repairs are frequently absent after utility street cuts.

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Strategies to Consider

- Emphasizing coordination, cooperation, and communication (CCC) among stakeholders.
- Establishing clear utility placement guidelines, installation methods, and adjustment processes.
- Modernizing utility permitting systems through automation and integration with other data systems.
- Improving utility location data quality through subsurface utility engineering (SUE) practices that adhere to ASCE 38-22 standards.
- Adopting the ASCE 75 standard for recording and exchanging utility infrastructure data to facilitate efficient data management and sharing among stakeholders.
- Designating utility corridors to consolidate infrastructure.
- Defining procedures for removing abandoned facilities and changing utility status.
- Setting pavement restoration standards and warranty periods for utility cuts.

Slide 30

Why is this important?

- Utilities are a public need…and they are not going away
- As a ratepayer, we want them in the public ROW
- ROW space is not infinite…it needs to be managed and that it the role of the permit
- As-builts are useful for all stakeholders
- SAFETY
  - https://commongroundalliance.com/DIRT-Dashboard

Slide 31

Project Deliverables

- Project Report (Comments from Review)
  - Technical Memorandum
- Training
  - On-line Recorded Training
  - In-Person Training

Slide 32

Training Outline

1. Introduction
- Overview of the research project and its objectives
- Importance of effective utility management in the public right-of-way

2. Current Utility Management Practices and Challenges
- Key findings from the literature review
- Survey results highlighting gaps and inconsistencies in practices

3. Best Practices for Utility Coordination
- Strategies for improving coordination among stakeholders
- Implementing the Coordination, Cooperation, and Communication (CCC) approach
- Case studies and examples of successful coordination efforts

4. Optimizing Utility Permitting and Installation
- Developing comprehensive permitting processes
- Establishing clear utility placement and installation guidelines
- Encouraging the use of trenchless technologies and joint trenching

5. Enhancing Utility Documentation and Mapping
- Implementing the ASCE 75 Standard for as-built documentation
- Leveraging ASCE 38 Standard and other digital tools for utility mapping
- Strategies for improving the accuracy and completeness of utility data

6. Managing Utility Removal and Abandonment
- Developing effective removal and abandonment policies
- Implementing permitting and approval processes
- Establishing tracking and management systems for abandoned utilities

7. Leveraging Technology and Data Management
- Overview of digital tools and platforms for utility management
- Strategies for integrating utility data with agency systems
- Best practices for data sharing and security

8. Fostering Stakeholder Collaboration and Communication
- Strategies for engaging utility providers, contractors, and other stakeholders
- Developing communication protocols and dispute resolution procedures
- Case studies and examples of successful collaboration efforts

9. Action Planning and Implementation
- Identifying priorities and next steps for improving utility management practices
- Developing an action plan for implementing recommendations
- Resources and support for ongoing improvement efforts

10. Conclusion
- Recap of key takeaways and best practices
- Importance of continuous improvement and adaptation to evolving needs
- Course evaluation and feedback

Slide 33

Questions and Discussion

APPENDIX F. PRESENTATION SLIDES FOR TRAINING CIRCUIT DELIVERED

Best Practices for Utility Management in the Public Right-of-Way

Basic Training

Roy Sturgill, Ph.D., P.E.
Sturgill@iastate.edu

IOWA | DOT

IOWA STATE UNIVERSITY
Institute for Transportation

Introduction

Participant introductions

Overview of the research project and its objectives

Importance of effective utility management in the public right-of-way

Participant Introductions

- Name
- Agency & Office
- Title
- Years of Experience
- What do you hope to learn today?

Course Overview

Training Objectives

Understand key challenges in utility management within public ROW

Learn best practices for utility coordination and permitting

Develop skills to implement effective documentation standards

Master strategies for managing utility removal and abandonment

Gain practical tools for stakeholder collaboration

Target Audience

State agency utility engineers

Utility coordination professionals

ROW managers

Transportation planners and designers

Why This Matters

Critical Challenges in ROW Management

Growing Infrastructure Demands:

- Increasing utility installations in limited ROW space
- New technologies requiring additional infrastructure
- Rising conflicts between different utility types

Current Statistics:

- **90%** of agencies lack formal utility as-built documentation processes
- **48%** have no clear utility placement guidelines
- **74%** don't utilize utility corridors
- **41%** lack formal restoration standard

Impact:

- Construction delays
- Increased project costs
- Safety hazards
- Public inconvenience

Best Practices for Utility Management in the Public Right of Way

PROJECT NUMBER: IOWA DOT SPR-RE22(011)-8H-00

ROY STURGILL, IOWA STATE

JEREMIAH ADEBIYI, IOWA STATE

JIM ANSPACH, IOWA STATE

JESSE COOPER, HDR

Research Background: SPR 3052 Project Overview

Research Methodology:

- Comprehensive literature review
- Survey of 53 Iowa agencies – *cities, counties and state agencies*
- Analysis of current practices
- Review of multiple state DOT policies

Key Research Components:

- Assessment of current practices
- Identification of gaps and challenges
- Development of best practices framework
- Creation of implementation strategies




Public Demand

Swelling public demand to utilize public ROW to accommodate utility infrastructure has escalated Iowa DOT ROW corridor congestion. Projects and utility systems are much more complex today.

Feasibility

Moving utilities out of the way for Iowa DOT projects is often no longer a simple matter and often not the best option (regarding project schedule, project cost, public disruption, societal cost, public interest).

Policy Revisions

Iowa DOT policies, procedures, and technologies for Managing Utilities in Iowa DOT ROW need updating.

Current Utility Management Practices and Challenges

Utility Accommodation Regulations and Practices

Key findings from the literature review

Survey results highlighting gaps and inconsistencies in practices

Current State of Utility Management

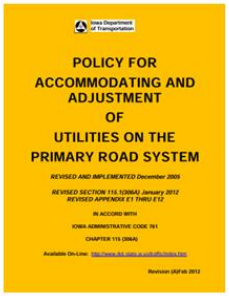
Key Areas Examined:

- Utility accommodation policies
- Permitting requirements
- Documentation practices
- Installation methods
- ROW management approaches
- Restoration standards

Background for Permitting Utilities in Public ROW

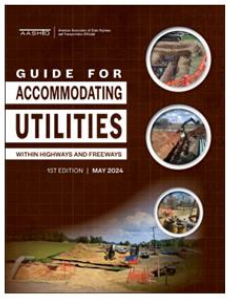
- Federal stance: "Utilities in public ROW is in the best interest of the public."
  - Taxpayer = Ratepayer
- Ties to Federal Regulations…23 CFR 645 Subpart B – Accommodation of Utilities
  - Primary concern for safety
  - Environmental Considerations
  - Joint use is encouraged
  - Accommodations should include plans to detail placement, type of installation, materials, method, timelines, etc.
  - Completion should include documentation of final placement ("as-built")

Background for Permitting Utilities in Public ROW

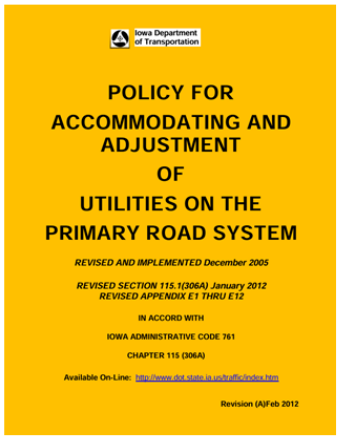


- State and local policies must be at least as stringent as the Federal policies (when Federal Funds are involved)
- Iowa DOT Utility Accommodation Policy (UAP)

Background for Permitting Utilities in Public ROW



- State policies are approved by FHWA Division Offices
  - Usually according to AASHTO guidance review



Points for Discussion

- Review Iowa DOT's UAP
- What topics are covered by your accommodation policy?
- Can you access it?
- Are there items for concern or discussion?

- Accommodation sets the stage for the rest of our discussions…

What are the challenges in permitting utilities in public ROW?

Discussion

Policy and Permitting

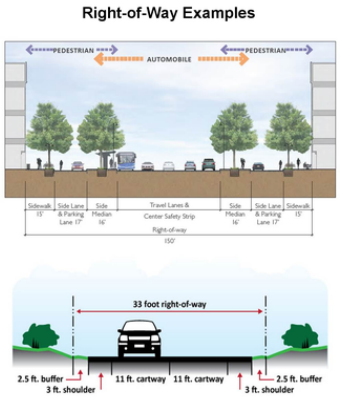
Standard Accommodation Policies:

- **59%** have standard policies
- **42%** lack formal guidelines
- Only **13%** reference Iowa DOT policy

Permit Requirements:

- **85%** require permits for installations
- **35%** charge accommodation fees
- **68%** require pre-registration
- **86%** require permits for maintenance

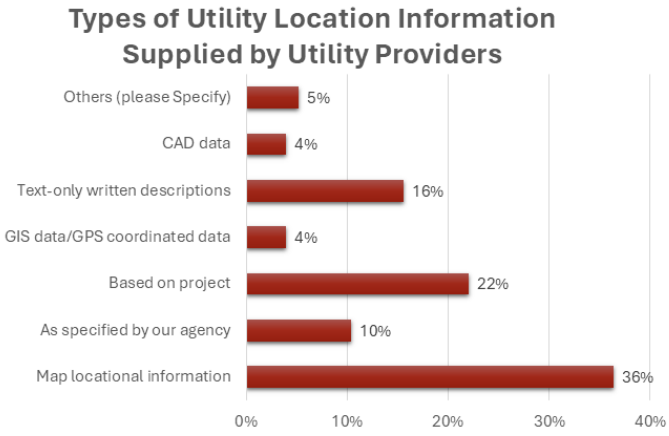
Application and Agreement for Use of Highway Right of Way for Utilities Accommodation



Documentation and As-Built Practices

Current Documentation Issues:

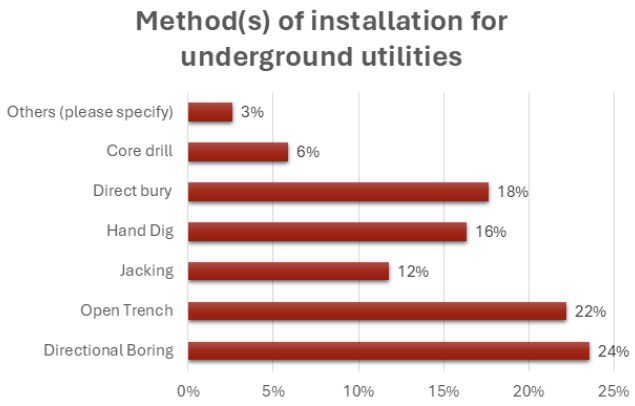
- Only **23%** require post-installation surveys
- **16%** mandate as-built submissions
- **8%** receive as-built documentation
- Average **1-2 months** delay in receiving documentation



Installation Methods and ROW Management

Installation Guidelines:

- **51%** have formal location guidelines
- **72%** have underground standards
- **42%** lack aboveground standards



Major Challenges in Current Practice

Policy Inconsistencies

1. Varying standards across jurisdictions
2. Limited alignment with state guidelines
3. Inconsistent enforcement

Management Challenges

1. ROW congestion
2. Coordination difficulties
3. Abandoned utilities

Documentation Gaps

1. Limited as-built requirements
2. Poor quality location data
3. Inconsistent record-keeping

Resource Constraints

1. Limited staff
2. Technology gaps
3. Budget limitations

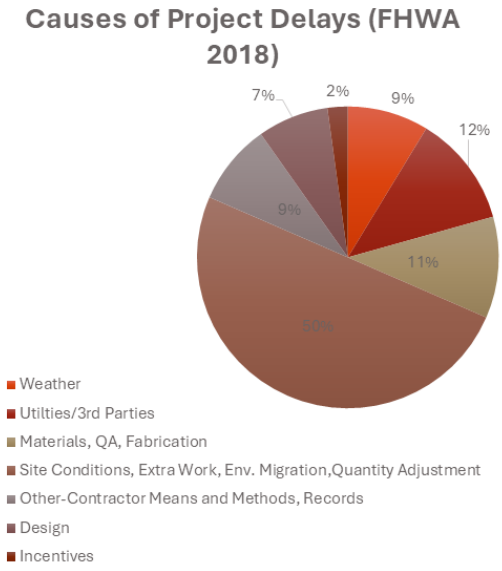
Consequences of Current Practices

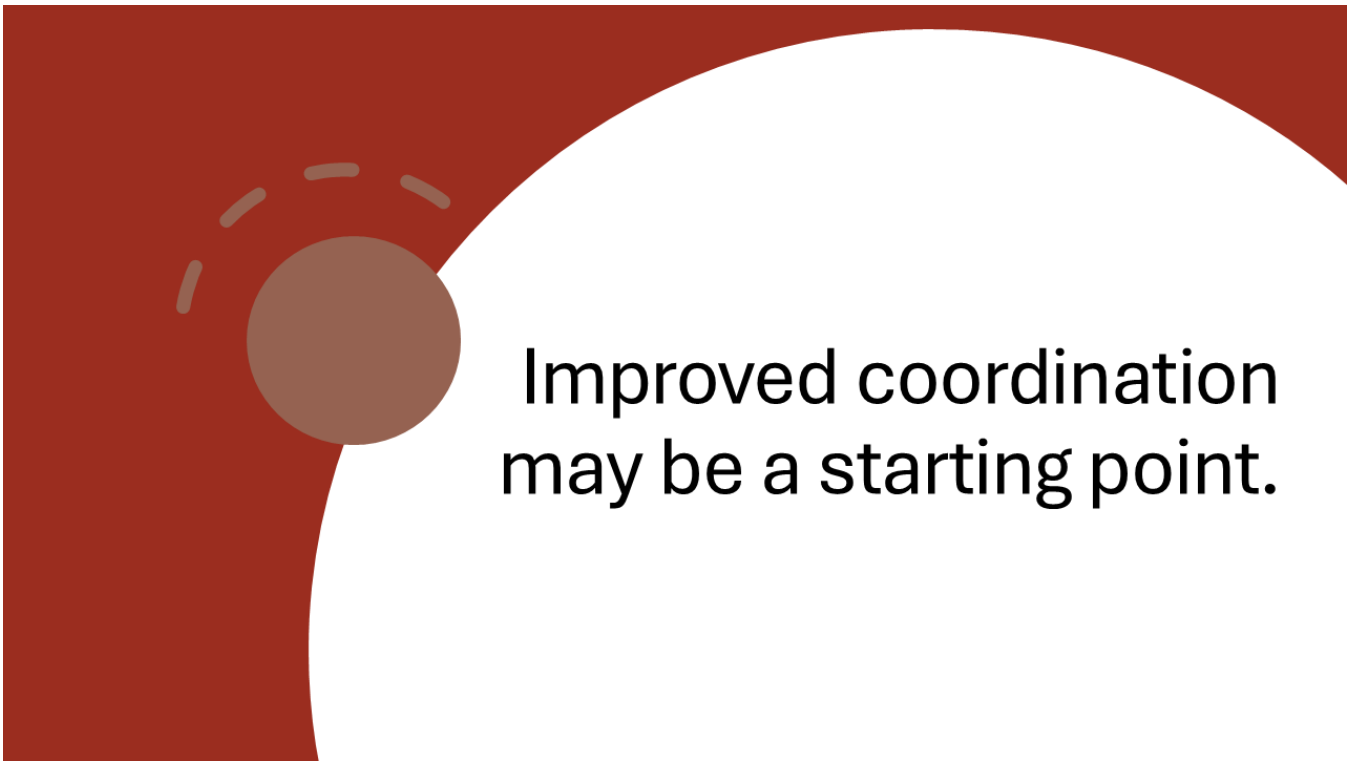
Project Delays - National Statistics:

- Utility relocation ranked as #1 to #3 cause of construction project delays
- State Highway Agency (SHA) Survey Results:
  - 20 states: 0-10% of projects delayed
  - 8 states: 11-20% of projects delayed
  - 6 states: 21-30% of projects delayed
  - 8 states: >30% of projects delayed

Case Study - South Carolina and Georgia:

- Utility-related delays account for 21% of all project delays (SCDOT, 2024)
  - Represents almost one-fourth of total project delays
- 43% of construction project delays are attributed to ineffective utility management (GDOT)





Strategies for improving coordination among stakeholders

Implementing the Coordination, Cooperation, and Communication (CCC) approach

Case studies and examples of successful coordination efforts

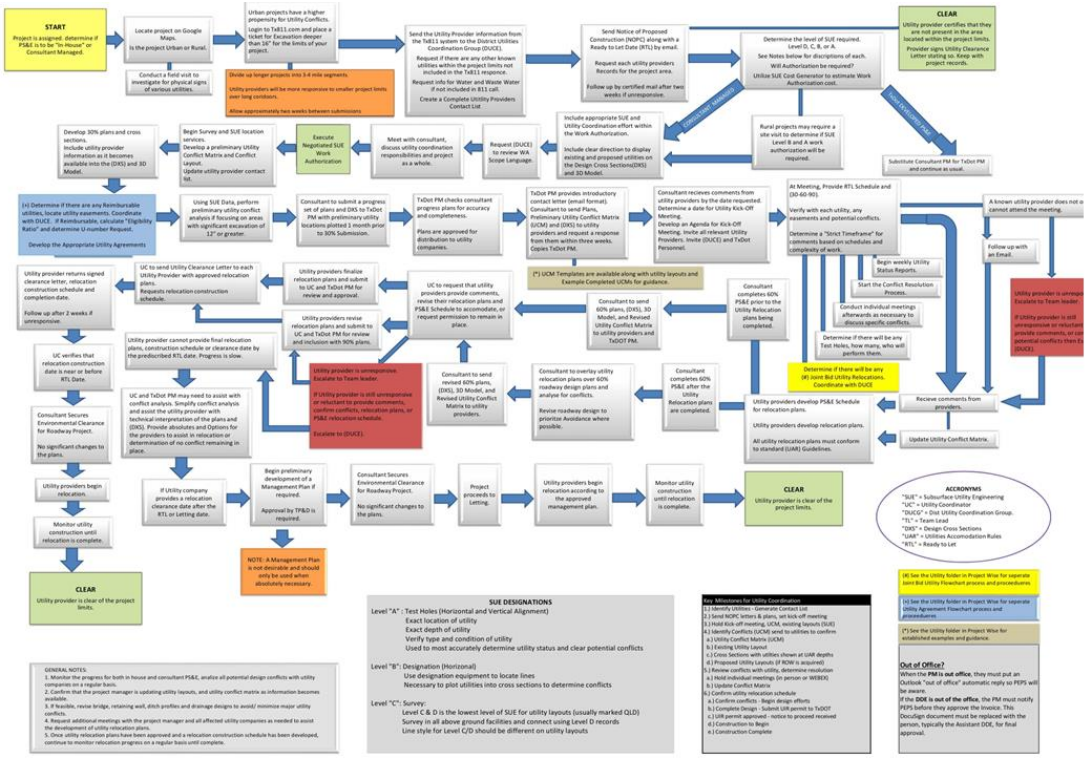
Understanding Effective Utility Coordination

What is Utility Coordination?

- Systematic approach to managing utility activities
- Integration of planning, design, and construction
- Stakeholder engagement and management
- Risk mitigation strategy

FHWA Utility Coordination Flowchart Guide-

Next Slide



Coordination, Cooperation, and Communication (CCC)

Coordination:

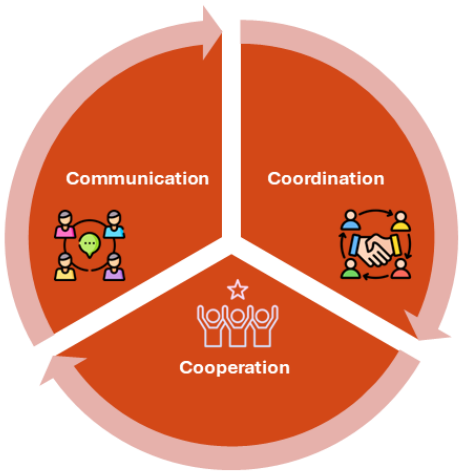
- Early involvement of stakeholders
- Integrated project planning
- Conflict identification and resolution
- Timeline management

Cooperation:

- Shared project goals
- Joint problem-solving
- Resource optimization
- Mutual benefits focus

Communication:

- Regular stakeholder meetings
- Clear documentation
- Information sharing protocols
- Feedback mechanisms



Implementing Effective Coordination

Early Utility Involvement

- Project conception stage
- Pre-design meetings
- Risk assessment

Systematic Conflict Management

- Use of Utility Conflict Matrices
- Regular conflict reviews
- Resolution tracking

Proactive Communication

- Scheduled coordination meetings
- Digital collaboration tools
- Progress reporting

Documentation Standards

- Standardized forms
- Digital record-keeping
- Accessible information systems

Coordination Success in Action

Case Study: Kentucky Transportation Cabinet (KYTC)

Key Elements:

- Early utility coordination
- Strategic SUE implementation
- Conflict management system
- Regular stakeholder meetings

Results:

- Reduced project delays
- Better cost control
- Improved stakeholder satisfaction
- Enhanced documentation

Making Coordination Work

- **Key Implementation Steps:**
  - Assessment
    - Review current practices
    - Identify gaps
    - Set objectives
  - Planning
    - Develop procedures
    - Create templates
    - Establish timelines
  - Execution
    - Train staff
    - Implement tools
    - Monitor progress
  - Evaluation
    - Measure outcomes
    - Gather feedback
    - Adjust approaches

- **Success Factors:**
- Leadership support
- Clear responsibilities
- Adequate resources
- Regular evaluation

Optimizing Utility Permitting and Installation

Developing comprehensive permitting processes

Establishing clear utility placement and installation guidelines

Encouraging the use of trenchless technologies and joint trenching

Utility Permitting Overview

Current State (Survey Findings):

85% require installation permits
35% charge accommodation fees
68% require pre-registration
86% require maintenance permits

Common Challenges:

Inconsistent requirements
Processing delays
Limited enforcement
Poor documentation

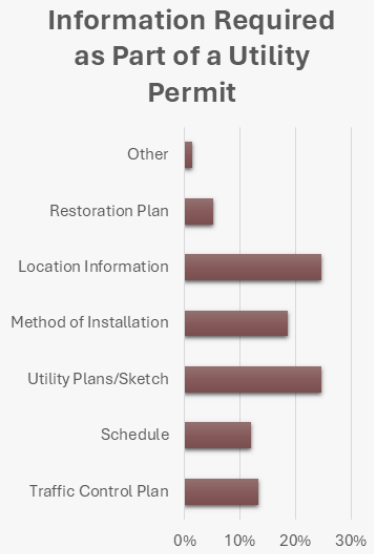
Components of Effective Permitting

Required Information:

- Traffic Control Plans (TCP)
- Installation Schedule
- Utility Plans/Sketches
- Method of Installation
- Location Details
- Restoration Plans

Supporting Documentation:

- Insurance Certificates
- Performance Bonds
- Emergency Contacts
- Contractor Qualifications



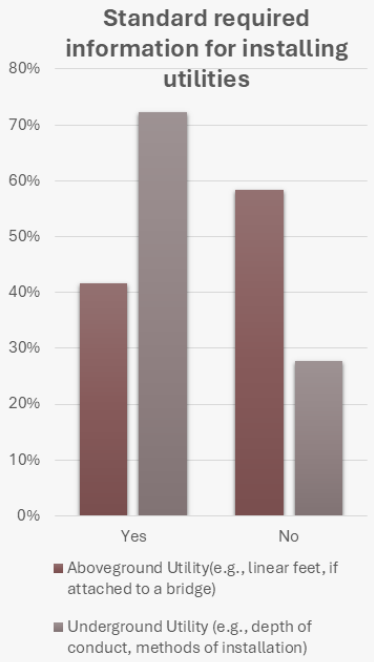
Installation Guidelines

Current Practices (Survey Results):

- 51% have formal location guidelines
- 72% have underground standards
- 42% lack aboveground standards

Approved Installation Methods:

- Directional Boring (24%)
- Open Trenching (22%)
- Direct Burial (18%)
- Other Methods (37%)



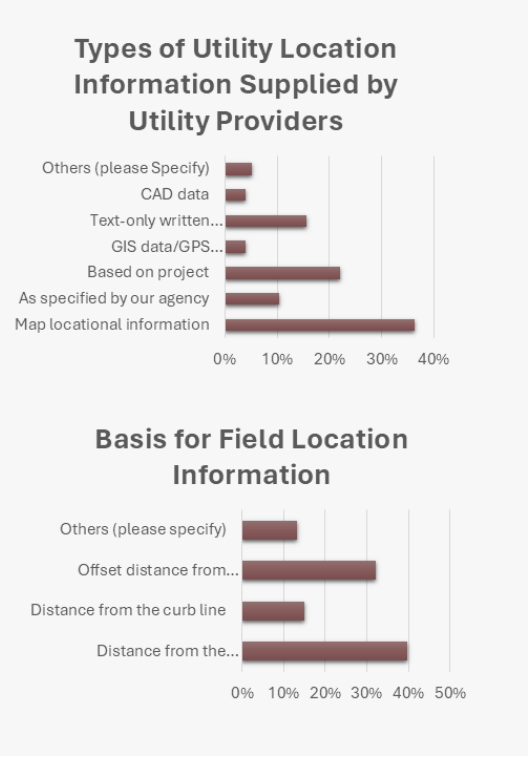
Location Standards: Utility Location Guidelines

Placement Criteria:

- Depth requirements
- Horizontal clearances
- Vertical separations
- Roadway crossings

Special Considerations:

- Clear zones
- Structure proximity
- Environmental factors
- Future expansion



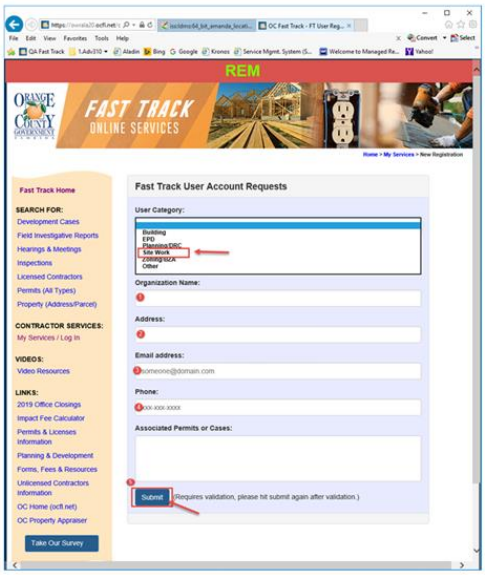
Modernizing Permit Processing

Digital Solutions:

- Online permit applications
- GIS integration
- Document management
- Automated workflows

Benefits:

- Faster processing
- Better tracking
- Improved accuracy
- Enhanced coordination



Systems Used in Iowa

Cities	ROW Permitting system
Ames	ROWay
Ankeny	
Bettendorf	
Cedar Falls	CF1Stop
Cedar Rapid	My CR
Council Bluffs	Paper form
Davenport	Paper form
Des Moines	Paper form
Dubuque	ROWay
Iowa City	CSS Portal
Marion	eSuite
Sioux	Form
Urbandale	Form
Waterloo	Form
West Des Moines	SharePoint

A Phased Approach

1. Adapt utility ROW occupation permitting process into a full utility infrastructure management system for controlling and capturing standardized data on all proposed and executed changes within IADOT ROW. (Commercial-off-the-shelf (COTS) applications are available for configuration and several other state agencies have already implemented similar solutions.)
2. Implement protocols and standards compliant with ASCE 75 for utility infrastructure owner data management and data sharing. (Iowa DOT has already built out an ASCE 75 compliant layer in their enterprise GIS and is developing data submittal language.)
3. Establish a Federated GIS Collaboration Portal at IADOT (later OCIO) for secure data sharing between authorized stakeholders. Many GIS applications have OGC compliant web service protocols, and enabled for broadcasting in a live, secure manner. (See Technology Modernization and Recommended Implementation section below.)
4. Implement guidelines for contractors to capture standardized utility infrastructure as-built data (compliant with ASCE 75) in the field during new installations or when exposed. (Iowa DOT has draft language under development.)

Permitting Systems Examples

Flairdocs
Process innovation > Real results.

Founded in 2001, Flairdocs is an Enterprise Software and solutions company specializing in Right-Of-Way Management, Systems Integration, and Business Process Management. Their solutions provide web-enabled and scalable solutions for document management, workflow management, reporting, system administration, cost estimation, eRecording and integration with GIS. (https://www.flairdocs.com/)

DELASOFT

For over 20 years Delasoft has been developing solutions for organizations and agencies to simplify and optimize their permitting processes. Their permitting platform provides a comprehensive solution for managing permits, collecting payments, inspecting event sites, and communicating with permit holders. The platform offers in-office and mobile capabilities, is scalable, includes highly configurable settings, and customizable modules integrated with GIS. (https://www.delasoft.com/)

RTVISION
SOFTWARE SOLUTIONS

Since 1999, RTVision solutions have advanced the management, planning, construction, and maintenance of infrastructure through innovative software applications for Transportation, State & Local Government, Water & Utilities, and Consultants. Their OneGov permitting application provides a fully customizable platform that can be used to build unique permits, inspection operations, and workflow processes. (https://rtvision.com/)

What might a ROW Management plan/policy look like?

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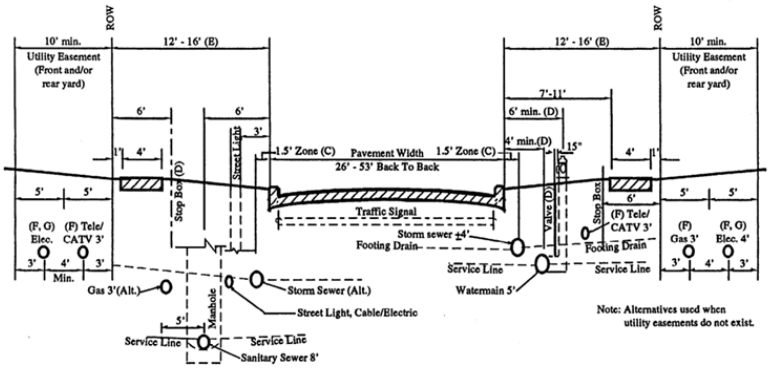


GENERAL NOTES:
(A) ROW width varies (see Design Standards).
(B) Unless otherwise approved, the following apply to utilities in the ROW:
1. Utilities are normally buried. When overhead utilities are allowed and cross the roadway, the minimum vertical clearance for main cable is 20 feet and service cable is 18 feet.
2. Telephone, cable TV and water are on east and south side of road
3. Gas, electric and sanitary sewer are on west and north side of road
(C) Storm Sewers: Normal clearance for intake is 1.5' from back of curb. When combination manholes and intakes are used, clearance increases to 5'.
(D) Watermains, Valves and Hydrants. Normal watermain location is 4' back of curb. For combination manholes and intakes, this distance will increase to a minimum of 6'. For local streets and minor collectors with limited ROW, use a 6" 90□ anchoring elbow o eliminate the coupling between the anchoring tee and valve. For maintenance purposes, the min. distance between centerline of valve box to face of hydrant must be 15". Stop boxes should be located 1' from ROW line in areas without sidewalks.
(E) Parking Area Widths. Varies by roadway classification (see Design Standards). Jurisdiction may require wider parking area for future widening.
(F) Utility Easements - Telephone, Fiber Optics, Cable T.V., Electric and Gas Lines: Located in front or rear yard easements on local and minor collector routes. For major collectors and arterials, they may be placed in ROW upon approval of the Jurisdiction. Normally, telephone and cable T.V. lines are placed in rear yards; fiber optics, electrical lines and gas lines in front yards. Placement of electric lines in rear yards depends on transformer locations and requires approval of the electric company and Jurisdiction.
(G) Electric Recommended bury for electric cable is 4'. Minimum bury for electric lines is per the National Electric Safety Code.

Figure 3-7: Sample Typical Section for Local Street.
Source: Patterned after Des Moines Metropolitan Design Standards
Note: 1 m = 3.28 ft

Recommendations for Implementation

Key Steps to Implementing Improved Permitting:

Policy Development
- Clear requirements
- Standard forms
- Fee structures
- Review procedures

Process Automation
- Digital submissions
- Online payments
- Status tracking
- Document storage

Quality Control
- Review checklists
- Inspection protocols
- Compliance monitoring
- Performance metrics

Staff Training
- System usage
- Review procedures
- Field inspections
- Documentation

Enhancing Utility Documentation and Mapping

Implementing the ASCE 75 Standard for as-built documentation

Leveraging ASCE 38 Standard and other digital tools for utility mapping

Strategies for improving the accuracy and completeness of utility data

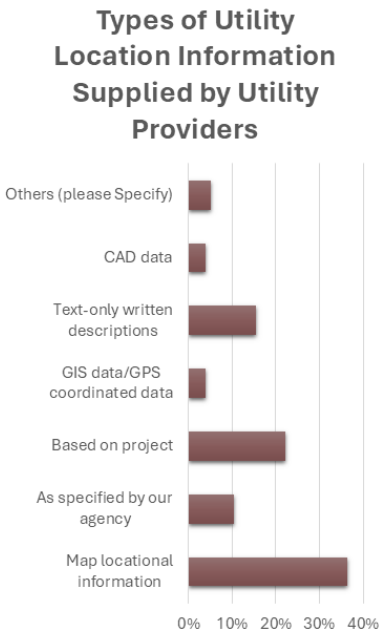
The Documentation Challenge

Survey Findings:

- Only 23% require post-installation surveys
- 16% mandate as-built submissions
- 8% receive as-built documentation
- Average 1-2 months delay in receiving documents

Current Location Information Types:

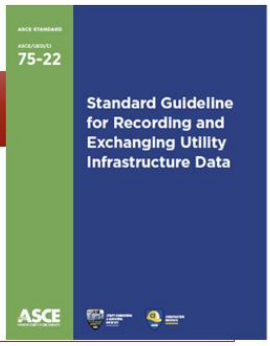
- Maps/drawings (36%)
- Project-specific info (22%)
- Text descriptions (16%)
- GIS/GPS data (4%)
- CAD data (4%)



ASCE Standards Overview: Industry Standards for Documentation

ASCE 75 Standard:

- Purpose and scope
- Key requirements
- Implementation benefits
- Quality levels



ASCE 38-22 Standard:

- Quality Level D: Records/oral recollections
- Quality Level C: Surface visible features
- Quality Level B: Geophysical methods
- Quality Level A: Exposed utilities

What is SUE?

Standardized process according to ASCE 38-02: "*Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data*"

- **Updated July 2022—ASCE 38-22: "*Standard Guideline for Investigating and Documenting Existing Utilities*"

Professional and programmatic approach to utility investigations

Provides a collection and depiction of utility information

A professional practice requiring a stamp (engineer and/or surveyor)

What is SUE?

Subsurface Utility Engineering

- SUE is not only potholing and magnetic wanding
- SUE (ASCE 38) is a practice, in a more global perspective of *collecting utility information, depicting that information, and making engineering judgement*
- *Understand the scope* of what you're asking for and *get an appropriate estimate* for that scope of work.
- Why developing a project using *One Call is likely not sufficient*

What is SUE?

SUE includes:

- Utility mapping with appropriate quality levels
- Utility coordination and communication
- Understanding of appropriately applying technologies (description in report)
- Subsurface, surface and aerial utilities
- Professional guidance and recommendations

It is a professional service…

What are the SUE Quality levels?

SUE QL- D — Review of existing utility records, permits, and plans for an approximate horizontal location.

SUE QL- C — Survey visible above ground facilities to facilitate better approximation of horizontal locations.

SUE QL- B — Use geophysical tools to determine the existence and horizontal position of underground utilities.

SUE QL- A — Use non-destructive digging equipment at critical points to determine precise horizontal AND vertical position (also type, size, and other characteristics).

What is SUE not?

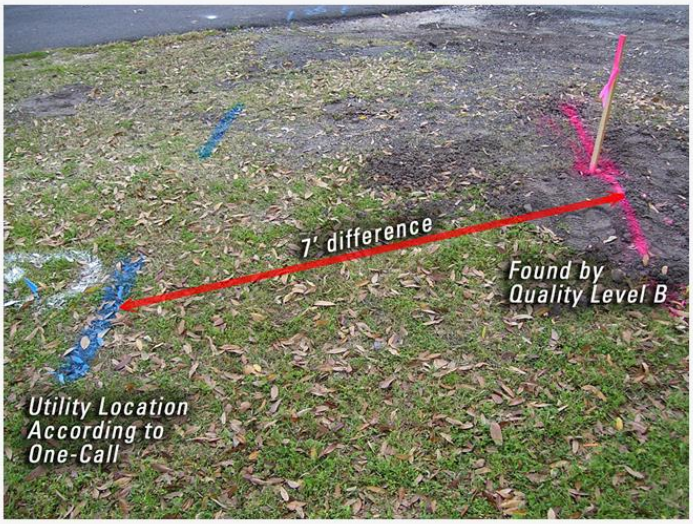
It is not simply "potholing" or daylighting

- Historical confusion

It is not only the assignment of quality levels

It is not surveying of One Call marks

It is not a laddered approach to using the quality levels (it could be; it's iterative)



One-Call is NOT Quality Level B!

FHWA Support for Using SUE

- Cost of SUE services is an eligible expense for federal-aid (Program Guide)
- Providers should be selected through quality-based approaches
- Federal funds should not participate in unnecessary utility-related costs resulting from non-use or improper use of SUE

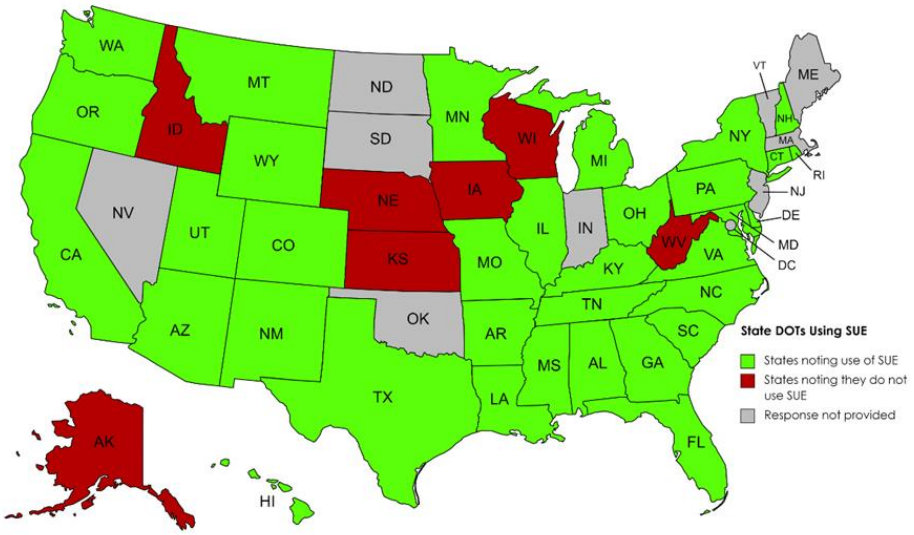
FHWA Support for Using SUE

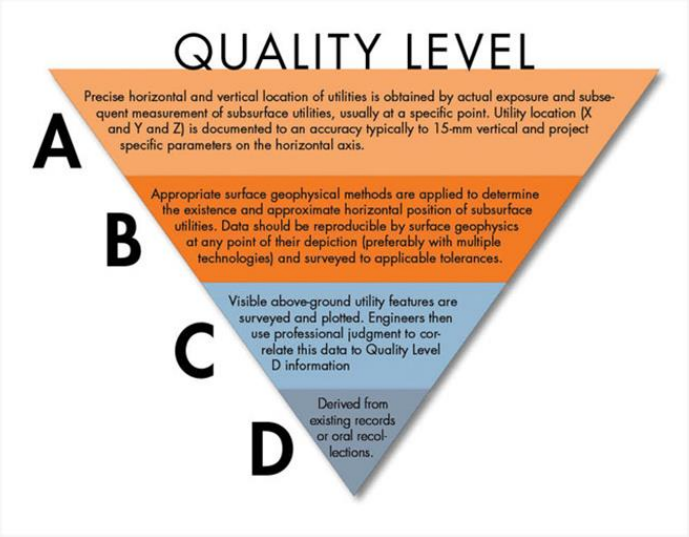
- Federal Program Review
  - Recommends a programmatic risk-based application of SUE
  - A majority of state DOTs were found to not be performing SUE adequately or methodically

Business Case for Using SUE

- Cost savings per dollar spent
  - $4.62, $22.21, $2.73
- Risk reduction
- Informed decisions
- Reduced delays
- Damage prevention and reduced outages
- Growth: 40% use-rate (early 2000's) to 83%
  - Not necessarily programmatic use

Use of SUE (41 Survey Responses)





Subsurface Utility Engineering

ASCE 38-02 Standards

- Timing & Quality Levels will vary by project
- The WHOLE system is SUE

ASCE 38 & 75

- Designed to be complementary

> The title of this standard has changed from its previous edition to (1) more succinctly convey its purpose, and (2) better differentiate it from ASCE 75-22, *Standard Guideline for Recording and Exchanging Utility Infrastructure Data*, which focuses on documenting newly installed infrastructure. Both underground and aboveground Utility networks need to be considered during Project Delivery. Resolutions of conflicts at one part of the network often affect other parts, whether they are subsurface or aerial. Sufficient Attributes of aerial networks and structures are often missing from topographical surveys, resulting in surprises of cost and time during Project Delivery. Therefore, a section on aerial Utility documentation is included.

ASCE 75-22

- "Standard Guideline for Recording and Exchanging Utility Infrastructure Data"
  - It's about as-builting! And the value of the data
  - Data accuracy/Positional Accuracy
  - What should be collected? Attributes?
  - Frequency of collection

Accuracy Level	Accuracy (Customary Units)	Accuracy (SI Units)
Level 1	0.1 foot	25 millimeters
Level 2	0.2 feet	50 millimeters
Level 3	0.3 feet	100 millimeters
Level 4	1 foot	300 millimeters
Level 5	3 feet	1,000 millimeters
Level 0	Undefined	Undefined

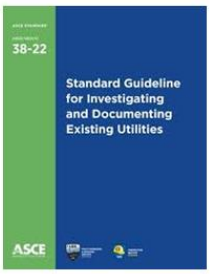
ASCE Standards

ASCE 75 Standard:

Purpose and scope
Key requirements
Implementation benefits
Quality levels

ASCE 38-22 Standard:

Quality Level D: Records/oral recollections
Quality Level C: Surface visible features
Quality Level B: Geophysical methods
Quality Level A: Exposed utilities



Digital Documentation Requirements

Required Information:

- Geospatial coordinates
- Depth measurements
- Material specifications
- Installation dates
- Ownership data
- Status information

Digital Formats:

- GIS data standards
- CAD requirements
- Database formats
- Metadata standards

Technology and Tools: Documentation Technologies

Field Collection Tools:

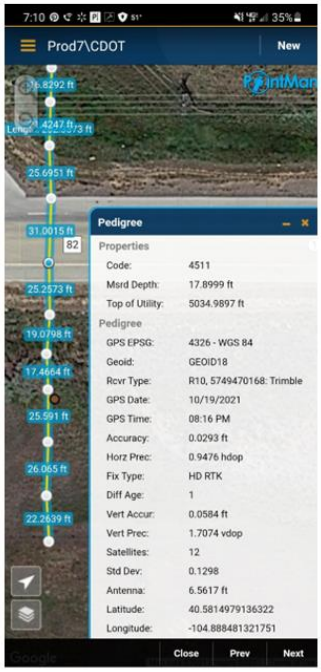
- GPS equipment
- Ground penetrating radar
- Mobile mapping systems
- Digital cameras

Data Management Systems:

- GIS platforms
- Asset management software
- Document management systems
- Cloud storage solutions

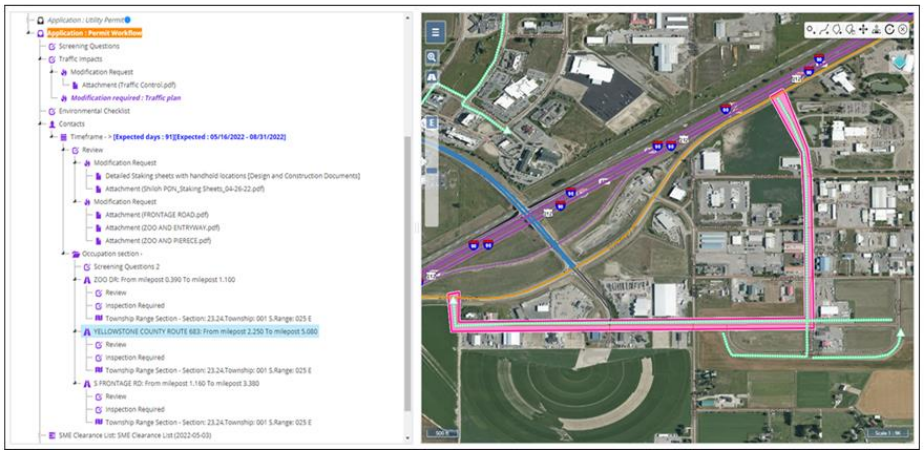
Examples…

- Varying approaches available…
  - Colorado →
  - Maryland GIS based apps
  - Utah CSV (XYZ) data files



Examples…

- Varying approaches available…
  - (MDT UPAS)



Implementing Documentation Standards

Step-by-Step Process:

1. Policy Development
    1. Documentation requirements
    2. Submission timelines
    3. Quality standards
    4. Verification procedures
2. Technology Integration
    1. System selection
    2. Data migration
    3. Staff training
    4. Quality control
3. Workflow Management
    1. Submission process
    2. Review procedures
    3. Storage protocols
    4. Access controls

Documentation Best Practices

Key Practices:	• Standardized templates • Clear requirements • Regular updates • Quality checks
Common Pitfalls to Avoid:	• Incomplete records • Delayed submissions • Poor organization • Inconsistent formats
Success Metrics:	• Submission compliance rates • Documentation quality • Access efficiency • Data accuracy

Managing Utility Removal and Abandonment

Developing effective removal and abandonment policies

Implementing permitting and approval processes

Establishing tracking and management systems for abandoned utilities

The Abandonment Challenge

Current State (Survey Results):

- 91.18% lack removal/status change procedures
- 94.12% have no abandonment permitting
- 77.14% don't allow utility status changes
- Limited documentation of abandoned facilities

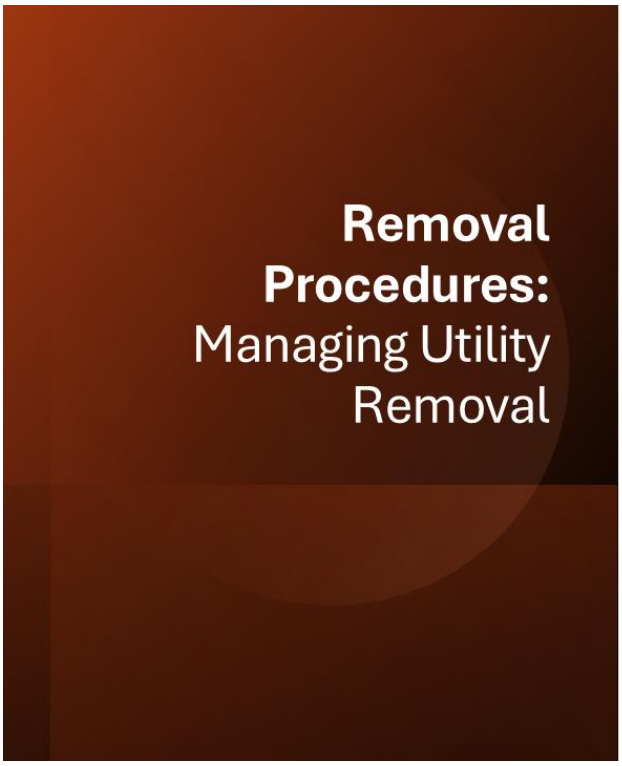
Impact of Poor Management:

- Congested ROW space
- Unknown infrastructure risks
- Complicated new installations
- Safety concerns

Essential Elements of Removal/Abandonment Management

Policy Requirements:

1. Clear Ownership
    1. Utility retains responsibility
    2. Liability considerations
    3. Maintenance obligations
2. Documentation
    1. Location records
    2. Status updates
    3. Condition assessment
    4. Future plans
3. Decision Criteria
    1. Remove vs. abandon
    2. Repurposing options
    3. Safety considerations
    4. Cost implications



Step-by-Step Process:

1. Initial Assessment
    1. Utility identification
    2. Condition evaluation
    3. Impact analysis
    4. Cost estimation
2. Planning
    1. Method selection
    2. Schedule development
    3. Resource allocation
    4. Coordination needs
3. Execution
    1. Safety Protocols
    2. Documentation requirements
    3. Quality control
    4. Site restoration

Abandonment Procedures: Managing Abandoned Utilities

Abandonment Requirements:

Formal notification
Location documentation
Status verification
Safety measures
Future access plans

Management Strategies:

Database tracking
Regular inspections
Conflict assessment
Removal triggers

Status Change Management: Managing Utility Status Changes

Change Categories:

Active to Abandoned

Abandoned to removed

Repurposed use

Temporary deactivation

Required Documentation:

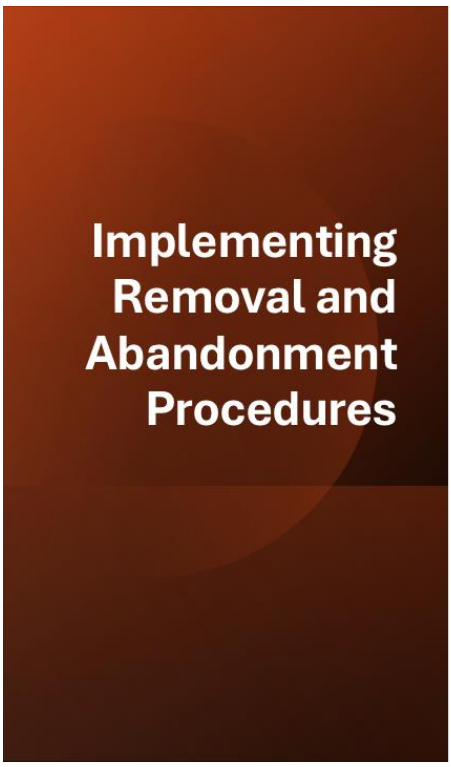
Current status

Proposed changes

Timeline

Safety measures

Future plans



Key Steps:

1. Policy Development
    1. Clear requirements
    2. Standard procedures
    3. Documentation needs
    4. Enforcement measures
2. Process Implementation
    1. Staff training
    2. Forms/templates
    3. Tracking systems
    4. Quality control
3. Monitoring & Enforcement
    1. Regular inspections
    2. Compliance tracking
    3. Issue resolution
    4. Process updates

Success Factors:

- Clear responsibilities
- Consistent enforcement
- Regular updates
- Stakeholder engagement

Other Training: NHI

- 134006 Instructor Led 2-Day Utility Coordination for Highway Projects (ILT)
- 134006A Utility Coordination for Highway Projects (WBT) prerequisite for the ILT
- 134117 Preparing and Communicating Effective Utility Relocation Requirements (WBT)
- 134208 Utility Investigations (WBT)
- 134209 Utility Conflict Management (WBT)
- 134210 Utility Data Management (WBT)

Leveraging Technology and Data Management

Overview of digital tools and platforms for utility management

Strategies for integrating utility data with agency systems

Best practices for data sharing and security

Technology in Utility Management

Current Technology Usage (Survey Findings):

- Only 3.90% use GIS/GPS data
- 3.90% use CAD data
- 36.36% still rely on basic maps/drawings
- Limited integration between systems

Impact of Limited Technology:

- Inefficient processes
- Data accuracy issues
- Poor information sharing
- Limited decision support

Essential Digital Tools for Modern Utility Management

Geographic Information Systems (GIS)

- Spatial database for utility locations
- Integration with permitting systems
- Visual mapping capabilities

Electronic Permitting Systems

- Online application processing
- Document management
- Workflow automation

Asset Management Platforms

- Inventory tracking
- Maintenance scheduling
- Life-cycle management

Creating a Connected Utility Management Ecosystem

System Integration Components:

- Centralized database architecture
- Standardized data formats (ASCE 75)
- Real-time updating capabilities

Key Integration Points:

- Permit processing systems
- GIS mapping platforms
- Asset management software
- Construction management tools
- One-Call systems

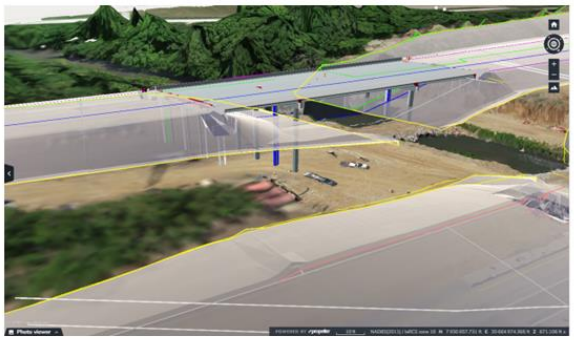
Phased Approach:

1. Assessment
    1. Current capabilities
    2. Staff skills
    3. Budget constraints
    4. Priority needs
2. Selection
    1. System requirements
    2. Vendor evaluation
    3. Cost analysis
    4. Implementation timeline
3. Deployment
    1. Staff training
    2. Data migration
    3. Testing
    4. Go-live support

Technology Best Practices

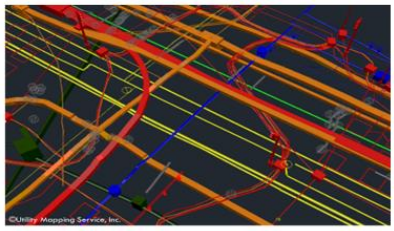
Key Practices:	Common Pitfalls:
• Start small, scale up • Focus on user needs • Ensure data quality • Plan for maintenance • Regular updates	• Over-complexity • Poor training • Inadequate support • Data silos • Security gaps

This is a changing landscape...



NCHRP 20-07 Task 418

An Impact and Value Analysis of Requiring Geospatial Locations for Utility Installation As-Builts



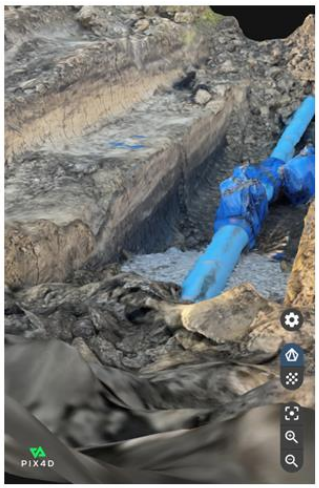
- Estimated annual savings of having digital/geospatially accurate utility as-builts:
  - $250,000,000 in damage prevention annually
  - $384,000,000 in reduction of needed SUE services annually

NCHRP Synthesis 20-05 Topic 53-04 *Practices for the Collection, Use, and Management of Utility As-Built Information*

- A majority of DOTs do not receive true utility as-builts
- A handful have implemented electronic systems for collecting the data and require as-builts
- Rapidly changing landscape
- Range of solutions available

PointMan System

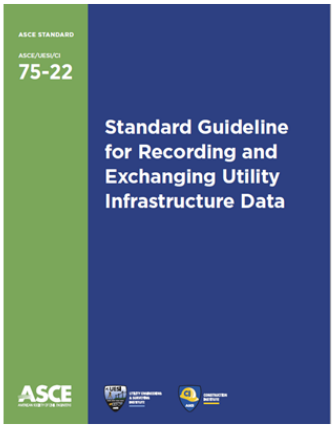
Example: As-builting made easy…



- Full model, instead of a few points…
  - How long did it take?
  - Accuracy: 0.033’

Geospatial as-builts offer a path forward!

- Iowa DOT DS-23045: GEOSPATIAL MAPPING OF SUB-SURFACE AND UNDERGROUND UTILITIES
  - Built from ASCE 75-22
- Having as-builts creates a circular data flow of utility information
- The technology is there to make it quick and easy…



Iowa DOT DS-23045

DS-23045
(New)

IOWADOT

DEVELOPMENTAL SPECIFICATIONS
FOR
GEOSPATIAL MAPPING OF SUB-SURFACE AND UNDERGROUND UTILITIES

Effective Date
November 21, 2023

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

23045.01 DESCRIPTION.
The purpose of this specification is to capture as-constructed or as-built geospatial information for subsurface underground utilities including highway lighting and agency communication lines. Asset information shall be recorded and submitted as directed in this specification. It is the intent of the Contracting Authority to capture three dimensional (3D) as-built data within Contracting Authority right-of-way in accordance with the most current version of ASCE 75. As such, ASCE 75 shall serve as a guiding reference for this specification. The DOT has condensed its specific language into this specification for brevity. Clarifications or questions may be answered within Standard ASCE/UESI/CI 75-22. All tables are from *Standard Guideline for Recording and Exchanging Utility Infrastructure Data*, ASCE/UESI/CI 75-22, with permission from ASCE.

23045.02 MATERIALS.
GPS Equipment to record geospatial location to 0.1 foot and utilize project Geoid and Iowa Regional Coordinate system or transform to those coordinates. See https://iowadot.gov/iarcs/Home for coordinate system.

23045.03 CONSTRUCTION.

A. General.
During the building process or when there is exposure of subsurface utility infrastructure, measurements for both horizontal and vertical coordinates should be taken at every unique feature. This includes locations of horizontal and vertical shifts, deflection points, and at regular intervals across each unique feature to ensure the desired precision of position is achieved. The precision of the position shall be documented on a 0 to 5 scale.

B. Data Collection.
The roles pertaining to data compilation and verification include, but are not limited to, the subsequent points:

1. Document the location and Positional Precision of utility features as per the directives of Table 1-1.
2. Log utility characteristic data in alignment with Table 1-2.

Iowa DOT DS-23045

H. Deliverables.

1. The data structure of all deliverables shall adhere to standardized field names, domain values, and depicted geometries, as shown in the Utility Layers Schema or enable direct mapping to the same. Geospatial shapefile (.SHP) with all corresponding files including the .PRJ file with coordinate information assigned, submitted to DOT-utilitydata@iowadot.us. A geodatabase template file may also be requested from DOT-utilitydata@iowadot.us.

2. ESRI Shapefiles or geodatabase are preferred, but alternative filetypes that are acceptable are: 2D and 3D Computer-Aided Design (CAD) files or design (DGN) refer to Chapter 40B-1 of the design manual Feature Codes – Full Descriptions (iowadot.gov), Comma-Separated Value (CSV) files, Building Information Modeling (BIM) files, Extensible Markup Language (XML) files, JavaScript Object Notation (JSON) files, Geographic Information System (GIS) files, Graphic Markup Language (GML) Files, Relational Database Records, Spreadsheet files, and Web Feature Services (WFS).

Table 23045.03-1. Levels of Positional Accuracy.

Accuracy Level	Accuracy (Customary Units)	Accuracy (SI Units)
Level 1	0.1 foot	25 millimeters
Level 2	0.2 feet	50 millimeters
Level 3	0.3 feet	100 millimeters
Level 4	1 foot	300 millimeters
Level 5	3 feet	1,000 millimeters
Level 0	Undefined	Undefined

IOWADOT

Ideal Scenario

This diagram illustrates a state managed federated GIS solution administered by the Iowa Department of Management's Office of the Chief Information Officer (OCIO). The research team highly recommends this approach as the OCIO is best positioned to federate and secure these services across all public stakeholders, such as state, county, and local municipality agencies that need access to utility data for numerous reasons, including disaster preparedness and emergency response activities.

Getting Started with Digital Transformation

Immediate Actions:

1. Conduct technology assessment
2. Develop data standards
3. Create implementation timeline Long-term Strategy:
4. Regular system updates
5. Continuous staff training
6. Performance monitoring Success Metrics:
    - Reduced processing time
    - Improved data accuracy
    - Enhanced coordination

Long-term Benefits:

- Better decision making
- Improved coordination
- Enhanced safety
- Reduced conflicts
- Better service delivery

Fostering Stakeholder Collaboration and Communication

Strategies for engaging utility providers, contractors, and other stakeholders

Developing communication protocols and dispute resolution procedures

Case studies and examples of successful collaboration efforts

Building Better Collaboration in Utility Management

Survey Results Highlight:

- 80% lack defined coordination procedures
- Limited formal collaboration processes
- Inconsistent communication channels
- Varied stakeholder engagement levels

Understanding the Utility Management Ecosystem

Key Stakeholders:

State/local transportation agencies

Utility companies

Contractors

Design consultants

Property owners

Primary Responsibilities

Interaction Points

Establishing Effective Communication Channels

Communication Framework:

- Regular stakeholder meetings
- Standardized notification procedures
- Digital collaboration platforms
- Project milestone reviews

CCC Approach Implementation

Building Strong Partnerships

Partnership Strategies:

Early stakeholder engagement
Clear expectations setting
Conflict resolution procedures
Joint planning initiatives

Success Metrics

Addressing Challenges Proactively

- Dispute Resolution Framework:
  - Common conflict sources
  - Resolution processes
  - Escalation procedures
  - Documentation requirements
  - Best practices

Making Collaboration Work

Implementation Steps:

- Short-term actions
  - Establish contact database
  - Regular coordination meetings
  - Communication templates

Long-term goals

- Formal partnerships
- Shared technology
- Continuous improvement

Action Planning and Implementation

Identifying priorities and next steps for improving utility management practices

Developing an action plan for implementing recommendations

Resources and support for ongoing improvement efforts

Planning for Implementation

Key Implementation Areas:

- Policy development
- Process improvements
- Technology Adoption
- Staff development
- Stakeholder engagement

Common Challenges:

- Resource constraints
- Resistance to change
- Competing priorities
- Technical limitations

Assessment and Prioritization

Assessment Areas:

1. Current Practices
   - Documentation methods
   - Permitting processes
   - Technology usage
   - Staff Capabilities
2. Gap Analysis
   - Policy gaps
   - Process inefficiencies
   - Technology needs
   - Training requirements
3. Priority Setting
   - Impact assessment
   - Resource requirements
   - Timeline considerations
   - Dependencies

What might you change?

What are your next steps?

Conclusion & Evaluation

Thoughts and discussion

Training Evaluation

Utilities Considered by Agencies

- Develop clear definitions for each utility type to ensure consistency and understanding among agencies. For example,
  - **Water:** Potable water distribution systems for residential, commercial, and industrial use
  - **Sanitary Sewer:** Wastewater collection systems for residential, commercial, and industrial use
  - **Gas (Distribution):** Natural gas distribution pipelines for residential, commercial, and industrial use
  - **Electric:** Power distribution lines and facilities for residential, commercial, and industrial use
  - **Telecommunications/Fiber:** Communication lines and facilities, including telephone, cable, and fiber optic networks.
  - **Oil & Gas (Transmission):** Pipelines that transport crude oil and natural gas from wells to refineries or processing facilities.
  - **Petroleum:** Pipelines that transport refined petroleum products, such as gasoline, diesel, and heating oil
  - **Irrigation Lines:** Water distribution systems for agricultural irrigation purposes
  - **Storm Sewer:** Stormwater collection and conveyance systems for drainage and flood control.

  - It is also important to distinguish between public and private utilities within these definitions, as they may have different characteristics, regulations, and management approaches.
- Encourage the adoption of a standardized list of utility types to be considered by agencies within their jurisdiction, based on the clearly defined utility categories. This will promote consistency in utility recognition and regulation across the state.
- Implement a statewide utility classification system that aligns with the standardized list of utility types. This system will ensure consistency across agencies and facilitate better coordination and data sharing among stakeholders.

Standard Accommodation

- Develop a new (updated), comprehensive utility accommodation policy tailored to the specific needs and characteristics of the agency's transportation system (FHWA, 2017).
- Adopt an adjacent city's policy, if applicable, to maintain consistency and coordination with neighboring jurisdictions.
- Use the State DOT policy as a foundation,and identify areas where the agency's policy will differ based on the unique requirements of the local transportation system (IOWADOT, 2012).
- Consider implementing separate policies for roadways with speed limits above and below 45 mph to account for the different design and safety considerations associated with each speed category.
- Develop a risk-based approach to utility accommodation policies, considering factors such as roadway classification, traffic volumes, and utility type to determine appropriate accommodation standards and requirements.

Permits and Registration Requirements

- Implement a comprehensive utility permitting system that standardizes the process for utility providers to obtain permits for installation, upgrade, or maintenance within public rights-of-way, integrating the system with GIS for efficient coordination and offering an online application and review process (Quiroga & Pina, 2004).
- Mandate pre-registration for all utility providers, requiring them to submit company details and insurance proof, and use this process to inform them about the agency's policies and standards, with a mechanism for regular updates to maintain accurate records and communication (Sturgill Jr, 2023).
- Standardize permit fees based on utility type, work scope, and public infrastructure impact, ensuring fees cover the costs of system administration and inspections, with clear communication to providers and regular updates to maintain alignment with agency objectives.
- Establish a robust compliance and enforcement program with clear performance standards for utility work, including regular inspections, a system for tracking violations with a tiered penalty structure, and staff training to enforce policies effectively
- Develop a dedicated website to serve as a centralized resource for utility providers, communicating essential information such as contact details, permitting processes, forms, file types, delivery methods, and expectations for required information. Ensure that the website is user-friendly, regularly updated, and includes clear instructions and guidelines to facilitate compliance with agency requirements (Quiroga et al., 2014b).

As-Built Documentation

- Mandate submission of as-built documentation, establishing clear guidelines and standards for content, format, and timeline. Require utility providers to submit as-built documentation within a specific timeframe (e.g., 30 days) after completing installation or maintenance work.
- Adopt the ASCE 75 Standard for as-built documentation to ensure consistent and reliable data across utility providers and projects (ASCE 75, 2022).
- Standardize as-built documentation formats, such as CAD or GIS, and provide specifications and templates for data submission (Meis et al., 2020; Nassereddine et al., 2023).
- Integrate as-built data with agency systems, such as GIS and asset management platforms, to create a comprehensive inventory of utility infrastructure(Nassereddine et al., 2023; Wang et al., 2019).
- Establish consequences for non-compliance with as-built documentation requirements, such as monetary penalties, denial of future permits, or legal action, depending on the severity and frequency of the violation. Clearly communicate these consequences to utility providers and consistently enforce them to ensure compliance.

Utility Location Information

- Adopt and enforce utility mapping standards, such as the ASCE 38-22 Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, while leveraging advanced utility locating technologies, such as ground-penetrating radar (GPR) and 3D laser scanning, to improve the accuracy and comprehensiveness of utility location data (Anspach & Scott, 2019; Sturgill et al., 2022).
- Implement a centralized utility data repository for storing, managing, and sharing utility location information across the agency and with relevant stakeholders (Quiroga et al., 2018).
- Promote stakeholder collaboration and data sharing through regular meetings, workshops, and data-sharing agreements (FHWA, 2018).

Installation Guidelines

- Develop and maintain comprehensive utility installation guidelines that cover all aspects of utility placement, construction, and maintenance within public rights-of-way (Quiroga et al., 2009; TAC, 2013).
- Establish clear utility placement and location criteria, considering factors such as roadway classification, available space, existing infrastructure, and future transportation needs, and safety requirements. Prioritize the avoidance of clear zones and minimize the impacts of construction and maintenance activities on the traveling public (AASTHO, 2011; Thorne et al., 1993).
- Specify approved installation methods and materials for different utility types and site conditions, encouraging the use of trenchless technologies and high-quality, durable materials (Ariaratnam et al., 2013; Najafi, 2010).
- Mandate proper site preparation and restoration, establishing clear requirements for site preparation activities and specifying required restoration methods and materials.
- Encourage coordination and co-location of utilities whenever possible to minimize the number of excavations, reduce traffic disruptions, and optimize the use of available right-of-way space (Quiroga et al., 2012).

Utility Corridors

- Develop and implement a utility corridor management plan that outlines goals, strategies, and procedures for designating, managing, and optimizing utility corridors within public rights-of-way (Kuhn et al., 2002).
- By integrating established regulatory frameworks, such as the 'Utility Strip' concept defined in CFR 645, the plan could ensure consistent and coordinated utility management that adheres to federal guidelines.
- Encourage the use of utility corridors in congested areas, developing incentives or requirements for utility providers to utilize shared corridors or co-locate facilities (Kuhn et al., 2002).
- Partner with utility companies to identify issues and find resolutions for sharing utility infrastructure. Establish regular communication channels, joint working groups, and collaborative decision-making processes to foster a cooperative approach to utility corridor management.
- Explore opportunities for joint trenching and shared infrastructure initiatives, developing guidelines and standards for cost-sharing, liability, and maintenance responsibilities.
- Monitor and evaluate corridor performance, using data to identify trends, challenges, and opportunities for improvement, and regularly report on the status and performance of utility corridors.

Removal and Abandonment Procedures

- Develop and implement a comprehensive utility removal and abandonment policy that clearly states the utility's ownership and full responsibility for abandoned lines. Define criteria, conditions, and documentation requirements for removal or abandonment, considering that abandoned utilities cause the same problems and delays as active utilities (CDOT, 2021).
- Require the removal of abandoned utilities whenever feasible, establishing criteria for determining when removal is necessary and allocating costs between utility providers and the agency. When removal is not possible, establish standards for the safe and proper abandonment of utilities in place (CDOT, 2021).
- Implement a permitting and approval process for utility removals and abandonments, requiring the submission of detailed plans, specifications, and schedules. Develop a tracking and management system for abandoned utilities, integrating data with the agency's GIS, asset management, and permitting systems.
- Standardize a process for handling abandoned lines, such as having an on-call contract to remove them when encountered during construction or maintenance activities. Provide training and outreach on removal and abandonment procedures, creating user-friendly guidance documents, checklists, and templates to assist stakeholders in understanding and complying with requirements (CDOT, 2021; Fort Worth City, 2012).

Restoration Standards

- Develop and implement customizable utility restoration standards, providing guidance and templates for agencies to develop their own detailed specifications based on local conditions. These standards should include a flexible warranty and liability system, allowing agencies to set terms and conditions based on their risk tolerance and legal requirements (CDOT, 2021)
- Establish a scalable quality assurance and inspection program for utility restoration work, providing guidance and best practices for developing and administering inspection programs (Thorne et al., 1993).
- Require the submission of restoration plans and as-built documentation, tailored to agency needs and capabilities, and encourage the use of digital platforms and data management systems to streamline the process.
- Foster communication and coordination among stakeholders, providing guidance and best practices for establishing communication protocols, dispute resolution procedures, and stakeholder engagement strategies tailored to local contexts

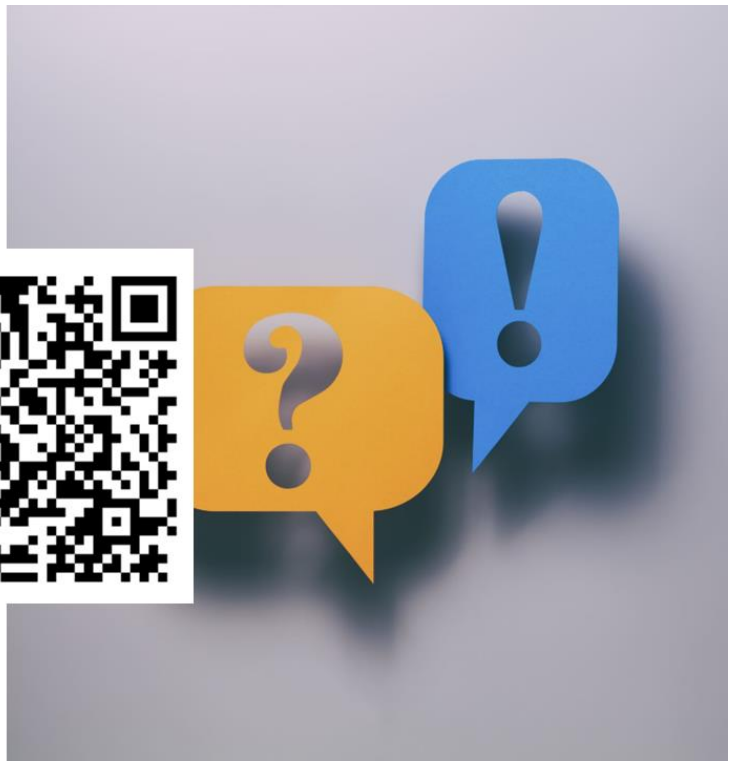
Summary of current policies and practices across various agencies in Iowa

- Inconsistent policies and coordination between state and local agencies as well as with utility providers. Very few agencies align policies with statewide DOT standards.
- Permitting and registration requirements are still lacking for 15-30% of agencies, enabling unregulated utility installations.
- Severe gaps exist in as-built documentation and mapping of newly installed utilities, causing uncertainties in location data.
- Around half of agencies lack adequate utility installation location guidelines and method oversight.
- Formal planning policies are rare for utility corridors and congested rights-of-way, leading to conflicts and inefficiencies.
- Removal of abandoned utilities or changing utility status is largely unregulated, resulting in inaccuracies and congestion over time.
- Restoration standards and defect warranty periods necessary to ensure quality repairs are frequently absent after utility street cuts.

Key Inferences

- Need for statewide standardization
- Importance of digital as-built documentation
- Potential benefits of utility corridors
- Need for improved congestion management
- Importance of permitting and installation oversight
- Necessity of robust restoration standards
- Regulation of abandoned and changing utilities

Questions, Discussion & Training Evaluation



Thank you!!!

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