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Analysis and Recommendations for Calculating Reimbursement Eligibility Levels for Utility Relocations

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16. Abstract

The Texas Department of Transportation (TxDOT) spends hundreds of millions of dollars on utility relocations every year. Of the various situations in which a utility relocation is eligible for reimbursement, one of the most complex situations is when parts of the existing utility facility involve a property interest because the utility owner either has an easement or owns the property in fee simple. A wide range of practices exist for what constitutes eligibility for reimbursement.

The purpose of this research was to review and provide recommendations on the methodologies TxDOT uses to determine reimbursement eligibility and calculate utility reimbursement amounts. The research team conducted a review of national practices that included an analysis of relevant laws, regulations, and manuals, as well as interviews with state department of transportation officials. The research team conducted an analysis of a sample of utility agreements at TxDOT, including a review of reimbursement costs and reimbursement eligibility calculation methodologies, and prepared recommendations for implementation. The recommendations include strategies to consider for the calculation of eligibility ratios as well as strategies to improve the quality of utility agreements to make the review and approval process more consistent, accurate, and reliable.

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ANALYSIS AND RECOMMENDATIONS FOR CALCULATING REIMBURSEMENT ELIGIBILITY LEVELS FOR UTILITY RELOCATIONS

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This research was sponsored by the Texas Department of Transportation (TxDOT) and the Federal Highway Administration (FHWA). The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of FHWA or TxDOT. This report does not constitute a standard, specification, or regulation. This report is not intended for construction, bidding, or permit purposes. The United States Government and the State of Texas do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of this report.

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LIST OF ACRONYMS AND ABBREVIATIONS

ALDOT	Alabama Department of Transportation
ADOT	Arizona Department of Transportation
ARDOT	Arkansas Department of Transportation
Caltrans	California Department of Transportation
CCUA	Consent to common use agreement
CDOT	Colorado Department of Transportation
CTDOT	Connecticut Department of Transportation
DelDOT	Delaware Department of Transportation
DOT	Department of transportation
FHWA	Federal Highway Administration
DOT&PF	Department of Transportation and Public Facilities
FDOT	Florida Department of Transportation
GDOT	Georgia Department of Transportation
HDOT	Hawaii Department of Transportation
IDOT	Illinois Department of Transportation
INDOT	Indiana Department of Transportation
IowaDOT	Iowa Department of Transportation
ITD	Idaho Transportation Department
JUA	Joint use agreement
KURTS	Kentucky Utilities and Rail Tracking System
KYTC	Kentucky Transportation Cabinet
LADOTD	Louisiana Department of Transportation and Development
MaineDOT	Maine Department of Transportation
MDOTSHA	Maryland Department of Transportation State Highway Administration
MassDOT	Massachusetts Department of Transportation
MDOT	Michigan Department of Transportation
MnDOT	Minnesota Department of Transportation
MoDOT	Missouri Department of Transportation
MsDOT	Mississippi Department of Transportation
MDT	Montana Department of Transportation
NCHRP	National Cooperative Highway Research Program
NDDOT	North Dakota Department of Transportation
NDOT	Nebraska Department of Transportation
NHDOT	New Hampshire Department of Transportation
NMDOT	New Mexico Department of Transportation
NVDOT	Nevada Department of Transportation
NYSDOT	New York State Department of Transportation
NCDOT	North Carolina Department of Transportation
ODOT	Ohio Department of Transportation
OrDOT	Oregon Department of Transportation
PennDOT	Pennsylvania Department of Transportation
ROW	Right-of-way

SCDOT	South Carolina Department of Transportation
SDDOT	South Dakota Department of Transportation
SUE	Subsurface utility engineering
TDOT	Tennessee Department of Transportation
TxDOT	Texas Department of Transportation
UDOT	Utah Department of Transportation
VDOT	Virginia Department of Transportation
WisDOT	Wisconsin Department of Transportation
WSDOT	Washington State Department of Transportation
WVDOT	West Virginia Department of Transportation
WYDOT	Wyoming Department of Transportation

CHAPTER 1. INTRODUCTION

The Texas Department of Transportation (TxDOT) spends hundreds of millions of dollars on utility relocations every year. For most highway construction projects, a fundamental question TxDOT managers must address is whether utility relocation costs (and the portion for which utility owners are eligible for reimbursement) are actual and reasonable. An agreement between TxDOT and the Federal Highway Administration (FHWA) allows districts to execute utility agreements. However, the Right of Way Division is still the office responsible for ensuring compliance.

Of the various situations in which a utility relocation is eligible for reimbursement, one of the most complex is when parts of the existing utility facility involve a property interest because the utility owner either has an easement or owns the property in fee simple. Throughout the country, utility relocation is reimbursable if the utility facility occupies private property and has a property interest or if the utility facility has a prior interest. If a utility facility occupies the state right-of-way (ROW) by permit and the utility facility needs to be relocated, in many cases the utility relocation is not reimbursable. Beyond this basic scenario, a wide range of practices exist among states for what constitutes eligibility for reimbursement. Factors include:

- Type of project (e.g., federal-aid, state, or local).
- Type of utility by use (i.e., public utility or private utility).
- Type of utility by ownership (i.e., publicly owned or privately owned).
- Type of utility service (e.g., water, wastewater, electricity, communications, or oil and gas).
- Utility owner size (e.g., large, mid-size, or small utility owner).
- Utility facility location (e.g., state highway ROW, city ROW, or county ROW).

For utility facilities that involve a private property interest, TxDOT uses an eligibility ratio (ER), which the TxDOT *ROW Utilities Manual* defines as the relationship between real property interest held inside the proposed highway ROW and the total highway ROW occupied by the utility facility, typically measured along the centerline of the existing utility facility (Texas Department of Transportation, 2025). The manual clarifies that if a utility conflict lies solely inside the joint use or acquisition of the utility's property interest, the eligibility ratio is 100 percent. In practice, eligibility calculations can be convoluted or complex, particularly in situations in which the utility facility spans multiple property interest locations.

The purpose of this research was to review and provide recommendations on the methodologies TxDOT uses to determine reimbursement eligibility and calculate utility reimbursement amounts. The research team conducted a review of national practices that included an analysis of relevant laws, regulations, and manuals, as well as interviews with state department of transportation (DOT) officials. The research team conducted an analysis of a sample of utility agreements at TxDOT, including a review of reimbursement

costs and reimbursement eligibility calculation methodologies, and prepared recommendations for implementation. The recommendations include strategies to consider for the calculation of eligibility ratios as well as strategies to improve the quality of utility agreements to make the review and approval process more consistent, accurate, and reliable.

This report documents the completed research, lessons learned, and recommendations for implementation. The report is organized as follows:

- Chapter 1 is this introductory chapter.
- Chapter 2 includes a national review of practices.
- Chapter 3 discusses the results of a baseline analysis.
- Chapter 4 describes a comparison of methodologies using a sample of utility agreements.
- Chapter 5 summarizes strategies to improve utility agreements.
- Chapter 6 summarizes conclusions and recommendations.

CHAPTER 2. REVIEW OF NATIONAL PRACTICES

INTRODUCTION

This chapter includes a review of national practices on the topic of reimbursement eligibility for utility relocations. The research team reached out to officials at 48 state DOTs. The research team received feedback from 33 state DOTs and conducted interviews with officials at 28 state DOTs. From these interactions, the research team learned about eligibility calculation procedures, issues with current practices, and strategies that state DOTs might be considering.

The research team leveraged information gathered as part of National Cooperative Highway Research Program (NCHRP) Project 11-08, Guide to Acquire Utility Property Interests and Reimburse Utility Relocation Costs (Quiroga, et al., 2023b). NCHRP 11-08 included a national review of relevant state laws and regulations and utility coordination manuals, as well as interviews with officials at 46 state DOTs and the District of Columbia. From the review of existing documentation and interviews, the research team developed an understanding of factors that determine whether utility relocations are reimbursable. As mentioned, factors include type of project (e.g., federal-aid, state, or local), type of utility by use (i.e., public utility or private utility), type of utility by ownership (i.e., publicly owned or privately owned), type of utility service (e.g., water, sewer, electric, communications, or oil and gas), utility owner size (e.g., large, mid-size, or small), and utility facility location (e.g., state highway ROW, city ROW, or county ROW).

NCHRP 11-08 included definitions of key terms to facilitate the comparison of practices among different states, including the following (Quiroga, et al., 2023a):

- Prior right: A utility owner's compensable interest at a location where a utility facility has existed since before the state DOT acquired that land for a highway project. The term prior right also applies to cases in which the state DOT acquired the utility property interest (or the utility property interest was extinguished—e.g., using a quitclaim deed), but through an agreement, the state DOT will pay for future relocations of the affected utility facility.
- Property interest: Right or privilege that an individual or entity has on real property. Common types of property interest include the following:
    - Fee simple estate: Type of property interest that enables the owner to exclusively possess, use, and convey the property.
    - Easement: Type of property interest that enables the right to use somebody else's property for a specific purpose but not possess or own the property.

SUMMARY OF STATE PRACTICES

This section includes a detailed account of the criteria that state DOTs use to reimburse utility owners for utility relocations, including a discussion about typical methods to calculate reimbursement eligibility. The summaries include information from laws,

regulations, and relevant state DOT manuals, as well as feedback provided by state DOT officials. In the summaries, the term relocation includes physical relocations and significant adjustments (that do not involve a relocation) that warrant a utility agreement. The term relocation does not include minor adjustments (e.g., a minor change in elevation) or repairs. It also does not normally include service lines or minor support structures such as guy poles or guy wires.

Alabama

At the Alabama Department of Transportation (ALDOT), utility relocations are reimbursable in the following cases:

- A utility facility occupies private property and has a property interest.
- A utility relocation is necessary for an interstate highway project.
- A utility relocation is necessary for a federal-aid project (except interstate highway projects) if the utility owner's gross receipts are $250 million per year or less.
- A utility relocation is necessary for a state project, provided the utility owner is certified to be a "pauper," meaning the utility owner must demonstrate that it is financially unable to bear the cost to relocate its facilities.

ALDOT does not accept prescriptive claims from utility owners. Utility owners must provide documentation providing evidence of a compensable property interest. In special limited cases, ALDOT includes water or sewer facilities in the roadway contract. ALDOT does not include electric, gas, or communication lines in the roadway contract.

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are eligible for reimbursement, ALDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement). ALDOT uses two utility agreements: One agreement for the reimbursable portion and a second agreement for the non-reimbursable portion.

The utility relocation cost only includes the portion of existing utility facilities that are inside the proposed ROW. ALDOT calculates eligibility based on the cost estimate that was used for the utility agreement. ALDOT reimburses utility owners based on actual relocation costs.

Alaska

At the Alaska Department of Transportation and Public Facilities (DOT&PF), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or prior right.
- A utility facility is located inside the existing ROW and has a permit issued on or after July 1, 1960.

- A utility facility was installed before July 1, 1960, or before the road became part of the state highway system.
- More than five years have passed between the date the utility permit was issued and the date the highway contract is advertised.
- The utility relocation is non-reimbursable, but the commissioner finds it in the public interest for DOT&PF to pay for the utility relocation.

Utility relocations are not reimbursable if the utility facility is inside the ROW of the James Dalton Highway. This highway was built as a supply road to support the Trans-Alaska pipeline. The legislation stipulates the official terminus points of the James Dalton Highway, but the actual beginning and ending locations are slightly different, which results in challenges for determining the reimbursement eligibility of utility facilities at those locations.

In Alaska, prescriptive right laws sometimes cause issues on projects in terms of relocations and permitting utility facilities in the ROW. Some roads operate under prescriptive right laws from ditch to ditch, and it is challenging to determine who has management authority. This practice can result in much time being spent determining property interests and management authority. In some instances, utility facilities are installed longitudinally but jump in and out of the ROW because of property ownership and prescriptive rights.

Most utility relocations are reimbursable. Of the few utility relocations that are non-reimbursable, most fall short of the five-year requirement for reimbursement eligibility. Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, DOT&PF determines eligibility based on reimbursable costs (assuming an in-kind replacement). The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property. Because of the way utility networks are often laid out in Alaska, it is common for utility relocation impacts to extend way beyond the proposed ROW, increasing utility relocation costs. For this reason, DOT&PF normally tries to resolve utility conflicts by avoiding utility facilities whenever possible.

DOT&PF reimburses based on actual relocation costs.

Arizona

At the Arizona Department of Transportation (ADOT), utility relocations are reimbursable in the following cases:

- A utility facility occupies private property and has a property interest.
- A utility facility is owned by a city, town, or county, and the utility facility existed inside the ROW of that highway when the highway corridor was established as a state highway. The utility relocation is not reimbursable if the utility facility occupies

the state ROW by permit, franchise, or other revocable agreement (unless authorized as part of a previous utility relocation).

Under certain conditions, ADOT accepts prescriptive right claims.

Arkansas

At the Arkansas Department of Transportation (ARDOT), utility relocations are reimbursable if a utility facility has a property interest or a prior right. ARDOT requires affected utility owners to provide documentation about the prior rights and necessary relocation plans, schedule, and cost estimate. ARDOT reviews the documents and plans to ensure that the proposed relocations and schedules will not result in additional conflicts.

ARDOT accepts prescriptive right claims in certain situations. For utility facilities on private property, utility owners provide an affidavit indicating the location and time of the occupancy. If it is obvious the utility facility is on private property, ARDOT often accepts the claim. In contrast, if the claim is for a utility facility inside the state ROW, the standard is much higher. ARDOT conducts thorough research to identify the circumstances and the time associated with the installation. ARDOT only approves the claim if it becomes clear from the documentation that the utility facility was there before the road or that a property interest exists.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that involve prior rights (as described above), ARDOT uses an eligibility ratio based on pole count, length, or cost, as follows:

- Pole count: ARDOT uses this method for aerial facilities that involve pole relocations. The eligibility ratio results from dividing the number of poles that are reimbursable by the total number of poles to be relocated.
- Length: ARDOT uses this method for underground facilities. The eligibility ratio results from dividing the length of cable, conduit, or pipe (as appropriate) on private property by the total length of facility to be relocated.
- Cost: ARDOT often uses this method when the high-cost items are located on private property, but the bulk of the linear installation is inside the state ROW. The eligibility ratio results from dividing the reimbursable cost (assuming an in-kind replacement) by the total estimated relocation cost.

If a utility owner operates two or more classes of service (e.g., distribution and transmission lines of gas and electric services, toll lines and exchange lines, or aboveground and underground telephone service), ARDOT calculates eligibility ratios separately for each class.

The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property. However, whenever possible, ARDOT works with the utility owner to limit the extent of the relocation to as close to the proposed ROW as possible while still making sure the utility facility becomes functional again. Each case is different. For utility relocation work on private property, the utility owner must submit documentation for ARDOT's review.

For the pole count and length methods, ARDOT calculates the eligibility ratio based on the estimated quantities that were used for the utility agreement. This eligibility ratio remains the same if it is not necessary to relocate additional facilities because of actual site conditions. For the cost method, ARDOT updates the eligibility factor at the low-bid stage and later at the final bill stage.

California

At the California Department of Transportation (Caltrans), determination of the superior right of occupancy associated with a utility facility is based on the following:

- Fee ownership.
- Easement (recorded or, occasionally, unrecorded).
- Implied/secondary easement.
- Joint use agreement (JUA) and/or consent to common use agreement (CCUA).
- Perfected prescriptive claim.
- Lease.
- License.
- Franchise (granted by a county or city).
- Encroachment permit.
- Trespass.

The first five items establish prior rights for which the state is liable for relocation costs. For the last five items, any relocation on conventional highways is at the utility owner's expense. Utility relocations in connection with freeway projects are reimbursable if they meet certain conditions. On freeways, if a utility facility needs to be relocated more than once within 10 years, the relocation cost is reimbursable. In addition, Caltrans has freeway master contracts with some utility owners, which may hold Caltrans liable for a portion of the utility relocation costs. Caltrans initiates utility coordination early in the project to determine utility property rights.

Caltrans recognizes prescriptive right claims if certain conditions are met, including a minimum of five years of continuous occupancy of private property. Prescriptive right claims do not apply against public property. For underground facilities, the property owner must know of the original installation and continuous maintenance of the facility in the prescriptive location. Caltrans perpetuates the utility owner's prescriptive right claims with a JUA or a CCUA if the prescription has been perfected by a court proceeding.

Caltrans does not actually recognize the property interest associated with a prescriptive right because doing so would imply that the utility owner receives a higher (i.e., perfected) property interest than what the utility owner had (i.e., a claim).

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, Caltrans calculates eligibility based on pole count, length, or cost, as follows:

- Pole count: Caltrans uses this method for aerial facilities that involve pole relocations. The proration results from dividing the number of affected poles inside the project limits by the total number of poles to be relocated. All the poles must be similar. If the affected poles are of mixed type, Caltrans uses the weighted average method (as described below).
- Length: Caltrans uses this method for underground facilities as well as aboveground facilities such as ditches and conduits. The proration results from dividing the length of cable, pipe, or conduit that is inside the project limits and is affected by the total length of facility to be relocated.
- Cost: Caltrans uses this method in situations in which there is a mix of facilities of distinct types. The calculation is the result of dividing the sum of reimbursable costs to relocate each type of affected facility inside the project limits by the total utility relocation cost.

The utility relocation cost includes the cost to make the utility facility functional again, including any work on private property.

For the three methods, Caltrans calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages.

Colorado

At the Colorado Department of Transportation (CDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right.
- A utility owner submits an affidavit supporting a prescriptive right claim, which CDOT finds acceptable for reimbursement purposes (not to establish a property right).
- A utility facility is owned by a governmental subdivision of the state or an abutting landowner on federal-aid primary or secondary systems or on the interstate highway system.
- Certain relocation costs are reimbursable if they are associated with design-build projects that extend the reimbursement eligibility beyond the two categories above.
- A utility facility exists to serve a highway purpose.

CDOT recognizes prescriptive easements by utility owners, provided the documentation is sufficient to meet minimum occupancy requirements (18 years) as established in prescriptive right legislation in Colorado.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are eligible for reimbursement, CDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement). The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property. CDOT also reimburses for any impact to abutting property owners because of the highway project, which results in adjustment, relocation, or repair of utility facilities inside their property.

CDOT calculates eligibility based on the quantities that were used for the utility agreement. The cost estimate in the utility agreement is based on quotes the utility owner receives from prospective bidders. CDOT reimburses utility owners based on actual relocation costs. In most cases, the actual costs are like those included in the utility agreement. In the past, CDOT relied on preliminary estimates that utility owners submitted, but the result was often actual costs that varied from the initial estimate.

Connecticut

At the Connecticut Department of Transportation (CTDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest.
- A utility facility is municipally owned and is inside a public ROW regardless of the functional classification of the roadway.
- A utility facility is privately owned and is located on a limited-access highway. On all other state highways, the reimbursement eligibility is 50 percent. Privately owned utilities on town roads are not reimbursable.

The issue of prescriptive right claims is not significant at CTDOT. CTDOT does not recognize prescriptive right claims against state property.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are eligible for reimbursement, CTDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement). The participation percentage is the result of dividing the sum of the costs to relocate the components that are reimbursable by the total cost of relocating all the lines.

The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property.

CTDOT calculates eligibility based on the cost estimate that was used for the utility agreement. This eligibility stays the same for the next stages. CTDOT has an approval process for any changes from the original scope or estimate.

Delaware

At the Delaware Department of Transportation (DelDOT), utility relocations are reimbursable in the following cases:

- A utility facility has prior rights.
- The utility facility is located on land the utility owner has in fee simple or by easement (per the 1963 *Delmarva v. DelDOT* Court of Chancery decision).
- A utility facility is owned or operated by a municipality or another political subdivision in Delaware.
- For nonmunicipal or other nongovernmental utility facilities, utility relocations are reimbursable as follows:
    - If a utility facility is inside the ROW via franchise or when work is necessary to address unique situations, reimbursement is 50 percent.
    - The cost to store unique materials or supplies if the utility owner must store those materials and supplies for more than 60 days prior to the start date of the utility relocation work.
    - Advance relocation (i.e., relocation in advance of the highway contract).
    - Change in plans at DelDOT.
    - Second relocation request within 10 years from the day of completion of the initial relocation.
    - DelDOT cancels the project or does not start construction within two years after DelDOT authorized the utility owner to start relocating.
    - Temporary utility relocation requested by DelDOT.

If the state has maintained a piece of property for at least 20 years, that property can be considered part of the ROW. Similarly, for utility owners, if they have used somebody else's property continuously for at least 20 years without permission from the landowner, they may be able to claim they have a prescriptive right or easement. In practice, it is not unusual to see plans showing utility facilities, particularly poles, just on the other side of the ROW line (i.e., on private property). The poles were intended to be on the state ROW but were never placed using proper surveying or layouts. As a result, they ended up on the "wrong" side. Potentially, this could become a liability for DelDOT if utility owners suddenly begin to claim prescriptive easements at those locations.

Utility owners cannot claim adverse possession against the state. As a result, a utility facility that has occupied the DelDOT ROW cannot claim an easement, even if the occupation has taken place for at least 20 years and there is no permit authorizing that occupation.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, DelDOT calculates eligibility based on pole count, length, or each facility, as follows:

- Pole count: DelDOT uses this method for pole relocations. The eligibility ratio results from dividing the number of poles that are reimbursable by the total number of poles to be relocated. For example, if an electric utility relocation includes 10 poles, of which 5 poles are reimbursable, the eligibility ratio for the electric line is 50 percent. DelDOT also uses the pole count method for pole attachment relocations, but it is also common to use the length method for the attachments.
- Length: DelDOT uses this method for underground facilities. The eligibility ratio results from dividing the length of the facility that is reimbursable by the total length of the facility to be relocated. In some cases, DelDOT does not calculate an eligibility ratio, but instead reimburses on a linear foot basis. Most cases involve using the length method.
- Each facility: DelDOT uses this method for individual facilities, typically high-cost facilities, for which the pole count or length methods are unsuitable.

The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property. An example of this situation is if a pipeline needs to go deeper, but in the process an additional adjustment on private property is needed so that the pipeline profile does not exceed a certain angle. Another example is fiber optic splicing, which might extend well into adjacent property until reaching the next splice box.

For all three methods, DelDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages. DelDOT reimburses utility owners based on actual relocation costs.

Florida

At the Florida Department of Transportation (FDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a compensable property right.
- A utility relocation is necessary for an interstate highway project.
- The difference between actual utility relocation costs included in the highway contract and the official FDOT estimate is reimbursable when the actual costs exceed the official FDOT estimate by more than 10 percent.
- The cost of ROW clearing that is necessary for a utility relocation completed prior to the construction phase is reimbursable.
- A utility relocation is necessary for a commuter rail or intercity passenger rail service project.

- A utility facility is municipality owned, or county owned, the utility owner cannot pay for the relocation for at least 10 years, and the utility work is included in the highway contract.
- A utility owner cannot demonstrate a compensable interest. However, certain conditions apply.
- An electric utility facility is relocated underground to enhance safety, and ownership of the facility has been transferred to a publicly owned utility owner within the last five years.

FDOT does not recognize prescriptive right claims against the state. FDOT uses a methodology to determine if a utility facility relocation is reimbursable in situations in which it is unknown whether FDOT or the utility owner had a prior right. Utility facilities that are installed without permission cannot claim prescriptive right claims against the state.

Georgia

At the Georgia Department of Transportation (GDOT), utility relocations may be reimbursable depending on a variety of factors, including type of utility facility by use (private or public), type of utility by ownership (publicly owned or privately owned), type of property interest (fee simple, easement, or permit), and location (on private property or inside the state ROW). To account for all these factors, GDOT's reimbursement policy has procedures for the following 10 cases:

- Case I: The utility facility has a compensable property interest.
- Case II: A utility facility is owned by a municipality, county, or authority and is located on the state highway system.
- Case III: A utility facility is owned by a municipality, county, or authority and is inside the jurisdiction of the city or county before the road becomes part of the state highway system.
- Case IV: The utility facility serves a transportation purpose (e.g., in the case of weigh stations, rest areas, or signal installations).
- Case V: The utility relocation is necessary to improve roadside safety. In this case, the utility owner usually pays at least 50 percent of the cost.
- Case VI: Utility installations are planned or are currently underway. GDOT reimburses additional costs to revise or relocate a utility facility for the portion that is outside the existing or acquired ROW.
- Case VII: An existing utility facility is located outside the ROW, but no documentation can be found regarding the utility's property interest. In that case, the utility owner submits an affidavit, which establishes a prior right for the purpose of reimbursement of the utility relocation cost but not a replacement ROW.
- Case VIII: GDOT determines that it is in the public's interest to pay for the relocation cost of a public utility (i.e., a utility facility that directly or indirectly serves the public).

- Case IX: A change made to the final plans affects a utility facility that has been relocated. The eligibility of utility relocations is determined on a case-by-case basis.
- Case X: GDOT determines that it is in the public's interest to relocate overhead utility facilities underground.

The portion of a utility relocation that is located on private property is 100 percent reimbursable. Portions of the utility facility located in the ROW are not reimbursable, except as provided in Cases II, III, IV, V, VIII, IX, or X.

GDOT makes a distinction between *prior rights* and *reserved rights*. A prior rights situation applies when a utility relocation is reimbursable because the occupancy of the utility facility predates existing or proposed ROW. A reserved rights situation applies when a utility owner owns the parcel where GDOT is acquiring ROW, and the utility owner would like to maintain the right to use the ROW for existing utility facilities.

Political subdivisions such as municipalities and counties are eligible for utility aid to cover utility relocation costs if GDOT determines that such payments are in the best interest of the project and the public, and the utility relocation is included in the highway contract. In practice, GDOT considers assistance for extreme hardship cases in which utility relocation costs would create an extreme financial burden on the utility owner and in situations in which major project design or schedule changes late during design cause additional costs to the utility owner with little time to budget the necessary funds. GDOT's participation in eligible utility relocation costs depends on the number of customers a utility owner serves, as follows:

- Greater than 25,000 customers: Up to 60 percent of utility relocation costs are reimbursable, excluding betterment, preliminary and construction engineering, inspection, and administrative costs.
- Up to 25,000 customers: Up to 100 percent of utility relocation costs are reimbursable, excluding betterment, preliminary engineering, construction engineering, inspection, and administrative costs. GDOT may provide final preliminary engineering at no cost to the utility owner. The utility owner has the option to complete the preliminary engineering at their own expense. GDOT has additional requirements for utility owners that serve less than 5,000 customers.

GDOT does not typically recognize prescriptive right claims. GDOT reviews individual situations on a case-by-case basis. Common cases in which GDOT might accept a prescriptive right claim involve electric distribution lines.

Hawaii

At the Hawaii Department of Transportation (HDOT), utility relocations are reimbursable in the following cases:

- A utility facility is privately owned and is located on a private easement.
- A utility facility is privately owned and occupies the highway ROW. In that case, the utility owner is responsible for the first $10,000. For costs exceeding $10,000, HDOT reimburses 50 percent of the costs.
- A utility facility is publicly owned.

Idaho

At the Idaho Transportation Department (ITD), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest.
- A utility facility has a prior right.

ITD recognizes prescriptive right claims against private property, provided certain conditions are met (e.g., a continuous occupancy for at least 20 years). ITD does not recognize prescriptive right claims against the state. According to a 1959 Idaho Supreme Court ruling, a prescriptive right claim for a utility facility located on public ROW is not reimbursable of relocation costs.

Illinois

At the Illinois Department of Transportation (IDOT), utility relocations are reimbursable in the following cases:

- Non-freeway highway improvement projects:
    - A utility facility is located on private ROW, and the utility owner provides sufficient documentation to prove it.
    - A utility facility is located on public ROW prior to the road becoming a state-maintained road, or it is located on or adjacent to an easement previously subordinated to the state. The utility owner must provide sufficient documentation to prove the prior right condition. Otherwise, the relocation is not reimbursable.
    - A utility facility is municipally owned and existed inside the defined limits of a local street before IDOT took over maintenance of that street. In addition, if an IDOT project intersects local streets and utility facilities are affected and need to be relocated (even if IDOT is not acquiring ROW), those utility relocations are reimbursable.
- A utility relocation is necessary for the construction of an interstate highway project, or for the construction of other freeways and expressways built under

relevant provisions of the Illinois Transportation Bond Act. If the relocation is in conjunction with highway reconstruction and the facility was adjusted during the initial construction of the highway, the utility relocation is reimbursable, excluding betterments or subsequent installations. Additional utility installations made after the initial construction of the interstate highway or other freeway facilities (which normally have a permit) are not reimbursable.

In some instances, IDOT has responsibility for roads by prescriptive right claims. This is rare and does not usually present problems with utility relocations or compensation. IDOT has paid for utility relocations where a utility owner proved they had prescriptive rights.

Indiana

At the Indiana Department of Transportation (INDOT), utility relocations are reimbursable in the following cases:

- Property interest: Utility facilities that have a property interest (as verified by INDOT) are reimbursable. A utility facility that is reimbursable for a verified property interest remains reimbursable for subsequent projects at the same location.
- Extraordinary costs: Extraordinary costs are utility relocation costs that are more than 10 percent of the utility owner's operating revenue during the most recent full fiscal year or more than 50 percent of the total estimated cost of the project.
- Interstate highway project: Utility relocations that are necessary for interstate highway projects are reimbursable if the utility facilities were installed prior to July 1, 1991. Except for crossings, utility relocations for facilities installed after June 30, 1991, are not reimbursable.
- Unnecessary relocation: This situation occurs if INDOT makes changes to the project causing a secondary utility relocation or if INDOT does not proceed with the construction within two years after the utility relocation work.
- Customer service line: Facilities that are inside newly acquired ROW are fully reimbursable regardless of ownership. Facilities that are inside the existing ROW are fully reimbursable if the utility owner does not own the service line. Facilities that are inside the existing ROW are not reimbursable if the utility owner owns the line.

In Indiana, utility facilities have a qualified right in relation to the state ROW. INDOT determines whether the property interest held by a utility owner qualifies for relocation and reimbursement on a case-by-case basis. Property interests that are typically reimbursable are fee simple and express (i.e., written) recorded easements. Property interests that are not reimbursable include implied easements and rights associated with permits, licenses, and franchises. INDOT's policy is that permits, licenses, and franchises are insufficient for reimbursement purposes because the corresponding rights granted are qualified, conditioned, or otherwise limited. For example, INDOT issues permits to enable the

accommodation of utility facilities inside the ROW, but the permits explicitly state INDOT's right to relocate the utility facilities at its election and at the sole cost of the utility owner.

INDOT's policy is that prescriptive easements are normally insufficient for reimbursement purposes because (a) prescriptive easements cannot be established against the state and (b) utility owners have difficulty satisfying the statutory requirement for a prescriptive easement that the use of the real estate is adverse, open, and notorious to the adjacent property owner. INDOT requires a court order establishing prescriptive easement rights in favor of the utility owner to be reimbursable.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, INDOT calculates eligibility based on length or cost, as follows:

- Length: INDOT uses this method in situations in which the utility facility size, construction method, or level of effort are consistent along the entire length of the utility line. INDOT calculates a participation percentage that results from dividing the length of cable, conduit, or pipe (as appropriate) on private property by the total length of facility to be relocated.
- Cost: INDOT performs separate cost estimates for reimbursable work and non-reimbursable work in situations in which the type of work varies substantially (e.g., if the reimbursable work involves a pipeline that is twice the size and goes through rock compared to the non-reimbursable work).

INDOT selects the method that makes the most sense and is both accurate and practical.

The utility relocation cost includes the cost to make the utility facility functional again, including any length inside private property. An example of this situation is if a pipeline needs to go deeper, but in the process an additional adjustment on private property is needed so that the pipeline profile does not exceed a certain angle. Another example is fiber optic splicing, which might extend well into adjacent property until reaching the next splice box.

INDOT calculates eligibility based on the cost estimate that was used for the utility agreement. INDOT reimburses utility owners based on actual relocation costs. For the length method, the participation percentage stays the same for the next stages, and the reimbursed amount results from multiplying the actual relocation cost by the participation percentage.

Iowa

At the Iowa Department of Transportation (IowaDOT), only utility facilities that have a property interest or a prior right are reimbursable.

Occasionally IowaDOT encounters prescriptive easement claim situations in which property lines are off by a few feet (e.g., if someone has accessed somebody else's property for 60 years). In these cases, IowaDOT will use quitclaim deeds for the stakeholders involved to release their interest in the area involved.

Prescriptive easements rarely involve utility owners. If a utility owner can show that they have been in place for at least 10 years without a formal easement, they may have a prescriptive easement. In these cases, IowaDOT will reimburse for the utility relocation and get a disclaimer of property interest for the area involved. In addition, if a utility owner can prove that their facility has been in the area prior to the existence of the road, IowaDOT will reimburse for the utility relocation. This happened recently with a water line that was inside city limits. The city had records showing the utility line location going back many years, even though there was no formal easement documentation. In this case, IowaDOT reimbursed the utility owner for the relocation of the water line.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, IowaDOT calculates eligibility based on pole count or length, as follows:

- Pole count: IowaDOT uses this method for pole relocations. The eligibility ratio results from dividing the number of poles that are reimbursable by the total number of poles to be relocated. For example, if an electric utility relocation includes 10 poles, of which 5 poles are reimbursable, the eligibility ratio for the electric line is 50 percent.
- Length: IowaDOT uses this method for aboveground and underground linear facilities. The participation percentage results from dividing the length of cable, conduit, or pipe (as appropriate) that is reimbursable by the total length of the facility to be relocated.

The utility relocation cost includes the cost to make the utility facility functional again, including any length inside private property. An example of this situation is when a pipeline needs to go deeper, but in the process an additional adjustment on private property is needed so that the pipeline profile does not exceed a certain angle. Fiber optic relocations into adjacent property until reaching the next splice box are not common because communication lines are exclusively on public ROW, which makes them non-reimbursable.

For both pole count and length methods, IowaDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages, unless a substantial change or areas are added to the relocation, making it necessary to process an addendum.

Kansas

At the Kansas Department of Transportation, utility relocations are reimbursable in the following cases:

- A utility facility has a property interest.
- A utility facility is owned by a rural water district or a municipality with up to 2,500 residents.

Kentucky

At the Kentucky Transportation Cabinet (KYTC), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest.
- A utility facility is located on property other than public ROW. KYTC is responsible for the utility relocation cost if the highway project is on a state route. Otherwise, the public agency that has jurisdiction over the public road and is sponsoring the highway is responsible for the utility relocation cost.
- A utility facility is owned by a municipality, water district, water association, sewer district, or local school district. Reimbursable costs include the cost to relocate the utility facility and the cost to acquire any property rights necessary to complete the relocation.
- A utility relocation is necessary for a project, a significant, ascertainable project benefit exists, and KYTC concludes that reimbursement is in the project's interest. KYTC uses this option sparingly on fast-track projects. In practice, KYTC has not observed a significant benefit in terms of consistently accelerating project delivery. Some utility owners that have been reimbursed in the past also want to get reimbursed on the next project and will slow down the relocation if they do not receive the benefit.
- A utility relocation is necessary for projects that focus on the reduction of roadside hazards.

KYTC's policy for all property acquisitions is to refer to the last deeded property owner. Prescriptive right claims in Kentucky are a judicial procedure before the courts, not an administrative procedure. In Kentucky, a requirement for prescriptive rights is adverse use for more than 15 years.

For utility relocations that meet the conditions under Ky. Rev. Stat. § 177.035 (i.e., those that do not meet the conditions under Ky. Rev. Stat. § 179.265, which deals with utility facilities located on private property), KYTC reimburses all utility relocation costs up to the level as described above.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that meet the

conditions under Ky. Rev. Stat. § 179.265 (i.e., utility relocations that include facilities located outside a public ROW), KYTC uses a participation percentage based on pole count, length, cost, or weighted average, as follows:

- Pole count: KYTC uses this method for aerial facilities that involve pole relocations. The participation percentage results from dividing the number of poles on private property by the total number of poles to be relocated.
- Length: KYTC uses this method for aboveground and underground facilities. KYTC uses linear feet if all the cable is of comparable size. The participation percentage results from dividing the length of cable (for each cable affected) on private property by the total length of cable to be relocated.
- Cost: KYTC uses this method in situations in which a utility relocation includes a contiguous run of poles and another contiguous area where the facilities are underground. The participation percentage is the result of dividing the sum of reimbursable costs to relocate each section of poles or underground cable by the total utility relocation cost. For example, a utility relocation includes 10 poles (of which 4 poles are on private property) that are contiguous to 1,000 ft of underground cable (of which 800 ft are on private property). The utility relocation costs are $120,000 for overhead facilities and $80,000 for underground facilities. The participation percentage is calculated as [(4/10) × $120,000 + (800/1,000) × $80,000] ÷ $200,000 = 56.00 percent.
- Weighted percentage: KYTC uses three weighted percentage methods for underground facilities. The first method involves separate estimates for each distinct size of line, each one accounting for the percentage of length on private property. The second method reflects both size and length of each line, each accounting for the percentage of length on private property. In this case, the size is a weight that applies to each length. The third method (which applies if all the lines are of the same size) involves calculating a percentage based on the length on private property divided by the total length. For example, a utility relocation includes 1,000 ft of 4-inch line (of which 500 ft are on private property), 1,000 ft of 6-inch line (of which 600 ft are on private property), and 1,000 ft of 8-inch line (of which 800 ft are on private property), the participation percentage is calculated as [(500 × 4) + (600 × 6) + (800 × 8)] ÷ [(1,000 × 4) + (1,000 × 6) + (1,000 × 8)] = 66.67 percent.

Utility owners calculate the participation percentage based on the method they decide is the most appropriate. KYTC reviews and approves the method selection process and calculations.

The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property. An example of this situation is when a sanitary sewer needs to go deeper, but in the process an additional adjustment on private property is needed so the sanitary sewer can maintain a proper vertical alignment. In any case,

KYTC works with the utility owner to find the most economical way to make the utility facility functional again.

For all the methods, KYTC calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages, unless a substantial change or areas are added to the relocation, making it necessary to process an addendum or change order. KYTC has a system called the Kentucky Utilities and Rail Tracking System (KURTS), which includes a tabulation of recent unit costs for utility relocations. The unit costs in KURTS are aggregated values districts enter manually and are intended to provide an approximate order of magnitude of the typical cost to install a utility facility. A typical use of the data is for preparing budgetary estimates and for requesting funding authorizations.

Louisiana

At the Louisiana Department of Transportation and Development (LADOTD), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right, including the following:
    - The utility facility is located on private property that LADOTD is acquiring for the highway project.
    - The utility facility is located on private property where LADOTD has a drainage or construction easement or permit (e.g., in a railroad ROW).
    - The utility facility was once located on private property but was relocated to accommodate a highway project or was allowed to remain in place after LADOTD acquired the ROW.
- A publicly owned or nonprofit utility owner is unable to pay for the relocation cost of a utility facility. The utility owner must go through an auditing process to determine what amount they can pay. LADOTD covers the remaining costs. For agreements prior to December 2016, the utility owner had to eventually repay the money back to LADOTD. Beginning December 2016, LADOTD has the authority to cover the utility owner's share of the cost, but the utility owner must agree for the relocation to be included in the highway contract. Either the utility owner or LADOTD is responsible for the utility relocation design. If the utility performs the design, the corresponding eligible engineering costs are reimbursable.

LADOTD does not accept prescriptive right claims against state property. As mentioned, utility relocations are reimbursable if the utility facility has a prior right. The burden is on the utility owner to provide appropriate documentation about this right. Utility owners must submit an affidavit that indicates the way the utility facility was installed (e.g., if there is a recorded or unrecorded servitude or grant or judgment of expropriation).

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that

are reimbursable, LADOTD calculates eligibility based on pole count, length, or cost, as follows:

- Pole count: LADOTD uses this method for aerial facilities that involve pole relocations. The participation percentage results from dividing the number of poles that are reimbursable by the total number of poles to be relocated.
- Length: LADOTD uses this method for underground facilities. The participation percentage results from dividing the length of cable, conduit, or pipe (as appropriate) that are reimbursable by the total length of facility to be relocated.
- Cost: LADOTD uses this method if the length or pole methods are unsuitable, typically when certain elements skew the total cost compared to a uniform calculation using the pole count or length methods.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property. Utility owners select which method to use, with the burden on them to provide adequate documentation and calculations supporting their percentage and costs for reimbursement.

Maine

At the Maine Department of Transportation (MaineDOT), utility relocations are reimbursable if the utility facility has a property interest.

The utility relocation cost only includes the cost to relocate utility facilities that are inside the proposed ROW. If it is necessary to perform utility work outside the project limits, MaineDOT does not reimburse utility owners for that portion of the work.

The requirement for a prescriptive right claim in Maine is 20 years. However, prescriptive right claims do not apply against the state.

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are eligible for reimbursement, MaineDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement).

MaineDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. Currently MaineDOT does not review quotes utility owners receive after the utility agreement is signed. However, MaineDOT reevaluates reimbursable amounts when actual relocation costs are available.

Maryland

At the Maryland Department of Transportation State Highway Administration (MDOTSHA), utility relocations are reimbursable in the following cases:

- A utility facility has a documented property interest or prior right.
- A utility facility is publicly owned, and the utility relocation is necessary for an interstate highway project.
- A utility relocation is necessary for a railroad grade crossing or railroad grade separation project. This category includes publicly owned and privately owned utility facilities.
- A utility facility is owned by a public service company franchise and is inside the ROW of a road that a county has transferred to MDOTSHA. MDOTSHA pays for the initial utility relocation unless the utility facility has a property interest from the county, in which case the property rights will continue.
- An aerial electric facility is relocated temporarily because a person or object might come within 3 m (10 ft) of a high voltage line (per Md. Code Ann., Lab. & Empl. § 6-107), and the poles and electric lines will return to the same horizontal and vertical location as before the highway construction. Reimbursement also applies if the electric line is not relocated temporarily, but the line is deenergized or protected.
- A utility facility is relocated a second time because MDOTSHA changes the project design (e.g., adding a noise wall at a location where the initial design did not have any and utility facilities had relocated there).
- MDOTSHA indefinitely suspends or cancels a highway project. MDOTSHA reimburses the utility owner up to the point when the project was canceled. If MDOTSHA reactivates the project within a certain timeframe, the reimbursed costs are added to the other work and are reimbursed according to the reimbursement eligibility described above.
- A utility facility such as lighting, water, wastewater, power, gas, or communications serves a transportation purpose such as lighting or serves a MDOTSHA facility, rest, or recreational area.

MDOTSHA does not recognize prescriptive easement claims. In situations in which the utility owner does not have proper easement documentation, MDOTSHA asks utility owners to formalize their current occupancy with the affected property owner. Prescriptive easement claims do not apply against the state.

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, MDOTSHA calculates eligibility based on pole count, length, or individual facility (which MDOTSHA calls indicators), as follows:

- Pole count: MDOTSHA uses this method for aerial facilities that involve pole relocations. The participation percentage results from dividing the number of poles that are affected and are reimbursable by the total number of poles to be relocated. MDOTSHA only counts poles that have significant work to be performed on them (i.e., poles that will be adjusted, relocated, or removed). MDOTSHA does not count service poles and guy poles that are incidental to the project, or poles that only involve adding wire or facilities).

- Length: MDOTSHA uses this method for underground facilities. The participation percentage results from dividing the length of cable, conduit, or pipe (as appropriate) that is affected and is reimbursable by the total length of facility to be relocated.
- Each facility: MDOTSHA uses this method for individual facilities such as vaults.

In cases in which the amount of relocation is significant across more than one indicator (e.g., a communication provider includes aerial cable, underground in conduit, and underground direct buried), MDOTSHA calculates a separate percentage for each indicator and then calculates a combined weighted percentage using the estimated dollar amount for each indicator.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property.

For all three methods, MDOTSHA calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages, unless a substantial number of facilities are affected after completing the initial cost estimate.

Massachusetts

At the Massachusetts Department of Transportation (MassDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest.
- A utility facility is owned by a municipality.
- A privately owned utility facility is reimbursable at 50–100 percent through an incentive-based policy using a utility relocation force account agreement. Most utility relocations in this category are reimbursable at 50 percent. MassDOT may vary the reimbursement percentage on a case-by-case basis. Utility owners qualify if they complete their relocations within the agreed work schedule. If they miss the deadline, the reimbursement is zero.
- Underground service connections, which property owners typically own, are 100 percent covered by MassDOT. The department decides whether this cost should be included in a utility force account agreement, construction contract items, or a combination of the two.

Minor adjustments to structures such as access boxes are not considered utility relocations and therefore are not reimbursable. The highway contractor normally manages these adjustments for municipally owned utility facilities. Utility owners manage adjustments of their own facilities.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are

eligible for reimbursement, MassDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement). The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property.

MassDOT calculates eligibility based on the cost estimate that was used for the utility agreement. MassDOT reimburses utility owners based on actual relocation costs.

Michigan

At the Michigan Department of Transportation (MDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a superior property right.
- A utility facility is municipally owned and is located inside the corporate boundaries of the municipality. If located outside, the utility relocation is reimbursable if the facility only serves customers inside the corporate boundaries.
- Storm sewer relocation costs are shared based on the contributing flow of each agency (state and local).
- A water main facility is reimbursable at 50 percent of non-federal costs if the relocation is included in the highway contract.
- Streetlight relocations are 100 percent reimbursable. Municipalities provide street lighting through agreements with electric utility owners. MDOT coordinates streetlight reimbursement with electric utility owners.

Prescriptive right claims are not a significant issue at MDOT. In the past, a few utility owners submitted claims, some of which were successful. In those cases, the utility owners provided an affidavit that was enough to support their claims.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, MDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement). The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property (within reason). MDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. MDOT reimburses based on actual utility relocation costs.

Minnesota

At the Minnesota Department of Transportation (MnDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property right, whether recorded or unrecorded, or an accepted prescriptive right claim.
- A utility facility is located on ROW that is part of an interstate highway project.

- A municipal utility facility is inside the boundaries of a city street for the first time when MnDOT takes over management of that city street. This provision does not apply to other utility facilities in the city's ROW.

MnDOT recognizes prescriptive right claims if certain conditions are met. In all cases, utility owners have the burden of establishing a valid claim to prescriptive rights. Utility owners must prove hostile, open, continuous, and exclusive use of the property for at least 15 years. However, prescriptive right claims do not apply on public ROW or on private property after the date of registration if the title is registered under the Torrens system. A utility owner must provide the precise extent of the right claim (e.g., describing the configuration of the poles, number of cross arms, and number of pole attachments). MnDOT then consults with the Attorney General's Office to determine whether a utility owner has a prescriptive right and whether the state should compensate that utility owner for their prescriptive right claim. If the claim is approved, MnDOT executes a utility relocation agreement, but without a property interest to quit claim. If the utility owner relocates their facilities inside the state ROW, they must apply for a utility permit.

Mississippi

At the Mississippi Department of Transportation (MsDOT), utility relocations are reimbursable in the following cases:

- A utility facility is located on private property, and the utility owner has a compensable interest.
- A utility facility is owned by a rural water district, a rural water system, or a nonprofit water association.
- A water, sewer, or gas utility facility is owned by a municipality with a population of 10,000 or less.

Prescriptive right claims are normally not an issue at MsDOT.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, MsDOT calculates a proration based on pole count or length, as follows:

- Pole count: MsDOT uses this method for aerial facilities that involve pole relocations. The proration results from dividing the number of poles that conflict with the project and are on private ROW or easement by the total number of poles to be relocated. MsDOT uses the pole count method for the main line (typically electric) and each tenant line (typically communications).
- Length: MsDOT uses this method for underground facilities. The proration results from dividing the length of cable, conduit, or pipe (as appropriate) that conflicts with the project and is located on private ROW or easement by the total length of facility to be relocated.

For utility relocations that involve segments where a pole count is appropriate and segments where a length calculation is appropriate, MsDOT normally uses the length method.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property.

MsDOT calculates a reimbursement factor based on the estimated quantities that were used for the utility agreement. This reimbursement factor stays the same for the next stages, unless it is necessary to execute a supplemental agreement that updates design elements that change the utility quantities affected, causing a review of the reimbursement factor.

Missouri

At the Missouri Department of Transportation (MoDOT), utility relocations are eligible for reimbursement in the following cases:

- A utility facility has a property interest or a prior right.
- A utility facility is owned by a municipality and is located on a city street that MoDOT is taking over as part of a MoDOT project. The utility relocation is reimbursable. However, future relocations are not because the facility will be occupying the highway ROW by permit. If the municipality-owned utility facility is located outside city limits, the utility relocation is not reimbursable. If the utility facility is inside city limits but is owned by an entity that is not a political subdivision, the utility relocation is not reimbursable.
- A utility facility is part of a sanitary or storm sewer system. In this case, reimbursement eligibility depends on what agency is responsible for the disposition of sewage and stormwater.
- The utility relocation cost would create financial hardship for the city or other political subdivision. In this case, MoDOT pays for the relocation upfront and establishes a payback agreement with the utility owner (not to exceed five years).

Prescriptive right claims do not affect ROW acquisition or utility relocations in Missouri.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, MoDOT calculates eligibility based on pole count, length, or prorating variation, as follows:

- Pole count: MoDOT uses this method for aerial facilities that involve pole relocations. This method can be used in lieu of the length method if a relocation involves poles. The proration results from dividing the number of poles on and off the public ROW that are affected by the highway project by the total number of poles to be relocated. This method is not common at MoDOT.

- Length: MoDOT uses this method for both underground and aboveground facilities. This method is the most common for prorating costs. The proration results from dividing the length of cable, conduit, or pipe (as appropriate) on and off the public ROW that is affected by the highway project by the total length of facility to be relocated.
- Prorating variation: MoDOT uses a variation in prorating procedures in coordination with the utility owner if the length or pole methods are unsuitable. The proration results from dividing the cost of relocating facilities on and off the public ROW that are affected by the highway project by the total cost of the utility relocation. This method is the most common at MoDOT.

Most utility relocations at MoDOT are either 100 percent reimbursable or not reimbursable. For city water facilities, if the utility relocation involves non-reimbursable components, MoDOT and the municipality often trade so the municipality completes the non-reimbursable portion at their cost and MoDOT takes care of the rest.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property. For work inside private property, utility owners must provide adequate justification.

For all three methods, MoDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages unless conditions change during the relocation (which does not happen often).

Montana

At the Montana Department of Transportation (MDT), utility relocations are reimbursable under the following situations:

- A utility facility has a property interest or a prior right.
- A utility facility is a public utility facility (other than publicly owned water or sewer facilities) inside the ROW of a commission-designated highway system by occupancy permit. Reimbursement eligibility is 75 percent. A commission-designated highway system includes highways inside the national highway system, primary highway system, secondary highway system, and urban highway system.
- A utility facility is a publicly owned water or sewer facility located on a commission-designated highway system or a state highway (i.e., a highway that is not a commission-designated highway system) under a utility occupancy permit:
    - If the cost of the utility relocation performed by a state contractor (excluding engineering costs) is up to $25,000, reimbursement eligibility is 100 percent.
    - If the cost of the utility relocation performed by a state contractor (excluding engineering costs) is over $25,000:
        - Eligibility is 100 percent for utility owners having up to 500 customers.
        - Eligibility is 85 percent for utility owners having more than 500 but less than 1,000 customers. The utility owner is responsible for MDT's

indirect cost rate, 8 percent of the utility owner's share for traffic control, and 8 percent of utility owner's share for mobilization.
    - Eligibility is 75 percent for utility owners having 1,000 or more customers. The utility owner is responsible for MDT's indirect cost rate, 8 percent of the utility owner's share for traffic control, and 8 percent of utility owner's share for mobilization.

Engineering costs are reimbursable for utility relocations associated with existing utility facilities inside a private ROW. Engineering costs are not reimbursable for utility relocations associated with existing utility facilities inside the public ROW.

MDT uses two types of utility permits (occupancy permits and utility encroachment permits), but they do not involve a property interest. MDT uses occupancy permits for new utility installations or to modify existing facilities. Utility encroachment permits apply to non-utility facilities as well as utility facilities for which the actual accommodation does not conform to the utility accommodation policy (e.g., if a utility owner proposes a location other than the outer edge of the ROW or if the actual location deviates from what the approved permit indicated).

Utility relocations associated with occupancy permits are reimbursable at 75 percent, 85 percent, or 100 percent (as discussed earlier) if the utility relocation happens inside the ROW. If the utility owner decides to relocate to a private easement, the utility owner is responsible for the relocation cost. Utility relocations associated with encroachment permits are not reimbursable.

What constitutes a public utility is not immediately obvious. For example, one state statute defines an oil pipeline as a public utility but does not include a natural gas pipeline in the definition of a public utility. For that case, a legal opinion has said that a natural gas pipeline qualifies as a public utility for relocation reimbursement purposes. To assess the public utility status, MDT uses ownership (i.e., publicly owned utility facility versus privately owned utility facility) and whether rates are regulated.

MDT does not recognize prescriptive right claims against the state. If a utility owner claims a prescriptive right on private property but cannot provide documentation, MDT asks for information to document the history of the occupancy. If approved, MDT reimburses for the cost of the relocation and, depending on the situation, for the cost to acquire an easement outside the ROW.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, MDT uses a participation percentage based on a pole count or length, as follows:

- Pole count: MDT uses this method for aerial facilities that involve pole relocations. The participation percentage results from dividing the number of poles that conflict

with the project and are reimbursable by the total number of poles to be relocated. For example, if it is necessary to relocate 25 electric poles, of which 10 poles are located on private ROW and 15 poles are inside the existing highway ROW, the participation percentage is calculated as [(10 × 1.00) + (15 × 0.75)] ÷ 25 = 85.00 percent.

- Length: MDT uses this method for underground facilities. The participation percentage results from dividing the length of facility that conflicts with the project and is reimbursable by the total length of facility to be relocated. For example, if it is necessary to relocate 3,600 m (12,000 ft) of 25-pair cable, of which 600 m (2,000 ft) are located on private ROW and 3,000 m (10,000 ft) are inside the existing highway ROW, the participation percentage is calculated as [(600 × 1.00) + (3,000 × 0.75)] ÷ 3,600 = 79.17 percent.

For installations that include both aerial segments and underground segments, MDT converts the linear segments to equivalent poles at a rate of 1 pole for every 100 ft of underground installation.

The utility relocation cost includes the cost to make the utility facility functional again, including any length inside private property, if the total length on private property is reasonable. For example, for pole relocations, MDT would approve one more aerial span. For fiber optic splicing, MDT would approve extending the line to an existing splice box if it is within a reasonable distance of the project. Otherwise, MDT asks the utility owner to add a splice inside the project limits (or closer to the project). In general, MDT's approach is to find the most economical way to resolve the conflict and make the utility functional again.

For both pole count and length methods, MDT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages unless a notable change in conditions occurs after the utility agreement is executed. MDT reimburses based on actual costs affected by the participation percentage. MDT uses a quantity-unit cost approach for preparing utility cost estimates. Once a year, utility owners submit a list of unit costs they intend to use for that year. Because MDT and utility owners use agreed upon unit costs, the only variables in the utility agreements are the quantities for each utility relocation item.

Nebraska

At the Nebraska Department of Transportation (NDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right.
- A utility relocation is necessary for an interstate highway project, unless a previous contract or permit between the utility owner and the state has a provision making the utility owner responsible for utility relocation costs.
- A utility facility is municipally owned and is inside city limits, regardless of whether it is located on public or private ROW.

NDOT recognizes prescriptive right claims against the state in certain circumstances. NDOT's highway permitting system started in 1954. If NDOT encounters a utility facility installed prior to 1954, NDOT determines the ROW line at that time when the utility facility was installed and compensates the utility owner based on the ROW conditions at that point. Then the utility owner is required to get a permit to stay in the state ROW. If there is not a record of a utility facility being permitted, they are not reimbursable.

Nevada

At the Nevada Department of Transportation (NVDOT), utility relocations are reimbursable in the following cases:

- A utility facility is located on ROW that existed before the highway became a state highway. The utility owner must submit an affidavit to that effect.
- A utility facility has a property interest that is compensable under eminent domain.
- A utility facility is on publicly owned land that NVDOT will not acquire, and an agreement with a city, county, or state agency makes the relocation reimbursable if funds are available (typically with federal funds).
- A utility facility is on publicly owned land and is owned by a public agency or political subdivision that is not legally bound to pay for the utility relocation.
- A utility facility occupies private property and has a prescriptive easement on that property. The utility owner must submit a statement declaring its prescriptive easement.
- A utility facility occupies private property under a license or other consent by the property owner.
- A utility facility occupies the ROW of a local street via a franchise agreement or other similar agreement, and the ROW is necessary for a local project administered by NVDOT. The agreement must include the appropriate federal participation.

A utility relocation is not reimbursable in any of the following cases:

- A utility facility occupies the state ROW by permit.
- A utility owner has an agreement (typically a franchise agreement) with a local government requiring the utility owner to relocate their facility because the project is funded solely with state funds.
- A utility owner has an agreement (typically a franchise agreement) with a local government requiring the utility owner to relocate their facility at their expense even though a portion of the project is managed by NVDOT.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, NVDOT calculates eligibility based on length or section, as follows:

- Length: NVDOT uses this method in situations in which the utility facility size, construction method, or level of effort are consistent along the entire length of the utility line and its compensable property rights. NVDOT calculates a participation percentage that results from dividing the length of cable, conduit, or pipe (as appropriate) that is reimbursable by the total length of facility to be relocated. For example, if 1,000 ft of pipe are in conflict and need to be relocated, of which 600 ft are reimbursable, the participation percentage is 60 percent. Most utility relocations use the length method.
- Section: NVDOT performs work according to sections that are defined by property lines and converted to project stationing. The utility agreement captures the financial responsibilities of each party based on what is reimbursable and what is not reimbursable for each section.

The utility relocation cost includes the cost to make the utility facility functional again, including work inside private property. In general, NVDOT analyzes the most economical way to make a utility facility functional. For example, if it is necessary to lower a sanitary sewer crossing, NVDOT examines whether installing a pumping station is more economical than extending the adjustment a long distance into private property.

For the length method, NVDOT uses the percentage of length based on the estimated quantities that were used for the utility agreement. This percentage stays the same for the next stages. NVDOT reimburses based on actual costs affected by the participation percentage. For the section method, NVDOT reimburses based on actual relocation costs. For utility relocations that take a long time to design and build, NVDOT often uses two agreements. The first agreement is a preliminary engineering agreement, which enables the utility owner to design the relocation, assess property rights, and start invoicing. This agreement might use a preliminary participation percentage. The second agreement is the utility adjustment agreement.

New Hampshire

At the New Hampshire Department of Transportation (NHDOT), utility relocations are reimbursable in the following cases:

- A utility facility occupies private property by easement or fee simple.
- A utility facility is in the ROW and had an easement prior to the acquisition of the ROW by the state or a municipality or had an easement prior to 1905 (when the department was incorporated), and the utility owner has not been compensated for easement rights.
- A utility facility occupies a highway ROW, and an easement was reserved to the utility facility in the highway return of layout. (Highway return of layout is the technical process of laying out the highway and comes from historical records.)
- The Attorney General's Office issues an opinion compelling the state to pay for utility relocation costs.

- A utility facility holds a permit or lease on land owned by the federal government. Federal participation is subject to the provisions in 23 CFR 660.
- A utility owner (other than power, telephone, railroad, or cable television) claims a prescriptive right by adverse possession. This situation requires an opinion from the Attorney General's Office.
- A utility facility is a municipally owned underground utility facility and is eligible for partial reimbursement (i.e., trenching, backfilling, and replacement value). Hydrants are not an underground facility, but pipes connecting to a hydrant are eligible.
- Framing and bracing of utility facilities during the construction and reconstruction of bridges are project costs.

Situations in which utility relocations are not reimbursable include:

- A utility facility, other than municipally owned, is on the highway ROW via permit or license.
- Electric or communication facilities are located on private property without an easement or ownership of property.
- A municipally owned aboveground utility facility on the state ROW without an easement or reservation of easement in return of layout.
- A utility facility is located on private property with a lease or rental agreement, and the property is acquired for highway ROW.
- The Attorney General's Office issues an opinion obligating the utility owner to bear all costs.
- Conduits and pipelines on bridges and the corresponding structural supports.
- Inspection of all service connections if these connections are not affected by the project's construction.

NHDOT does not recognize prescriptive right claims against the state. NHDOT recognizes prescriptive claims by a utility owner other than power, telephone, railroad, or cable television based on a corresponding opinion by the Attorney General's Office. Some municipal utilities were established before NHDOT was established in 1905. In these instances, the municipality has the underlying right because it was established first, and NHDOT pays for those relocations.

New Jersey

At the New Jersey Department of Transportation, utility relocations are reimbursable for 100 percent of eligible utility relocation costs.

New Mexico

At the New Mexico Department of Transportation (NMDOT), utility relocations are reimbursable in the following situations:

- A utility facility has a compensable property right.
- A utility facility has a public use, and the utility relocation is necessary for an interstate highway project, including extensions inside urban areas. Utility relocations are not reimbursable if the facility was installed with knowledge of future conflict or if a permit provision or agreement indicates the utility owner should pay for the relocation.
- A utility facility has a public use, the utility relocation is necessary for a non-interstate highway project, and a JUA authorizes reimbursement of the utility relocation.
- A utility facility needs to be relocated more than once because of a change in design in the highway project that was not caused by the utility owner.
- A utility facility is owned by a special district, municipality, or county that can demonstrate it is unable to pay for the relocation costs.

If it is necessary to relocate a utility facility that occupies a public ROW to another public ROW, the utility relocation is not reimbursable.

The relocation reimbursement process depends on whether the use of the utility facility is public or private and whether the facility is currently inside the existing ROW or on private property. The relocation of a private utility facility located on private property and not dedicated to public use is managed as a real estate transaction.

NMDOT does not recognize prescriptive right claims against the state. Utility owners must prove that they owned or occupied the property before the road was built and NMDOT acquired the ROW.

Sometimes NMDOT encounters problems with oil and gas companies related to mineral rights. In a typical situation, a company has the right to use state property for mineral exploration, development, and production, using a permit issued by the Bureau of Land Management, but the company does not have an easement for any facilities in the ROW. This situation has often generated legal disputes. If a company can prove the mineral right permit predated the construction of the road, NMDOT assumes the utility facility existed before the road was built and reimburses utility relocation costs. However, in many cases, companies choose to settle disputes in court. Companies that have resources for a lengthy legal dispute often hope the state will give up the fight and settle so the roadway project can move forward.

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are eligible for reimbursement, NMDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement). The utility relocation cost only includes the portion of the work inside the proposed ROW. If it is necessary to perform utility work outside the project limits, NMDOT might consider reimbursing that cost, but NMDOT reviews the proposed reimbursement carefully.

NMDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. NMDOT reviews the cost estimates internally, but realistically NMDOT utility coordinators do not always have the expertise to assess the reasonableness of every single cost estimate. In addition, utility relocations might not take place for several months after the utility owner submitted the initial cost estimate, which further reduces the reliability of the initial cost estimate. To address this issue, NMDOT has increased the contingency level from 15 to 20 percent, which unfortunately increases the project budget (and districts might need to manage by reducing the budget for other projects). NMDOT is also increasingly relying on consultants to review cost estimates that utility owners submit.

For utility relocations that utility owners let out to bid, the utility owners must request authorization from NMDOT to award the contract based on a statement from the utility owner to the effect that the amount bid is not excessive for the work to be completed. In addition, NMDOT reviews reimbursable amounts when actual relocation costs are available.

New York

At the New York State Department of Transportation (NYSDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior interest.
- A utility facility is municipally owned and is located on highway ROW or private property.
- A non-municipally owned utility facility is on private ROW.
- A utility relocation is necessary for an interstate highway project.

Prescriptive right claims are not an issue for NYSDOT. In some cases, property owners have claimed prescriptive rights on state property, but statutory laws are clear that property owners cannot appropriate state property through prescriptive right claims.

North Carolina

At the North Carolina Department of Transportation (NCDOT), utility relocations are reimbursable in the following cases:

- A utility facility is inside a recorded easement or property deeded to the utility owner.
- A utility facility has a prior right.
- A utility facility is located on land without a recorded easement, but the utility owner can demonstrate a legal right, usually through adverse possession or a ruling of prescriptive rights.
- A utility facility is inside the existing ROW and is part of a water or sewer system that is owned by one of the following:

    - A municipality with a population of 10,000 or less.
    - A nonprofit association or corporation.
    - A water or sewer authority.
    - A county rural water system operated as an enterprise system.
    - A sanitary sewer district.
    - A local school board.
    - An investor-owned water or sewer system that serves up to 10,000 customers.
- A utility facility is inside the existing ROW, is part of a municipally owned water or sewer system, and the population is more than 10,000. In this case, the reimbursement level is 75 percent if the population is more than 10,000 but less than 50,000, or 50 percent if the population is more than 50,000 but less than 100,000. The reimbursement is zero if the population is 100,000 or greater.
- A utility facility is a gas line owned by a county and inside a state highway ROW.
- A utility facility needs to be relocated a second time, or the utility design needs to be redone because NCDOT has changed elements of the project design.
- A utility facility needs to be relocated at NCDOT's request to facilitate the convenience and efficient movement of another utility facility.

NCDOT accepts claims of compensable interest if the utility owner provides proof of adverse possession or a ruling of a prescriptive right. To have a compensable interest by adverse possession, possession must have begun at least 20 years before the state took over the ROW. Examples of acceptable documents include historical deeds, affidavits by individuals that have personal knowledge of the history of the area and facilities, historical pictures from local or state archives, and utility owner records. A utility owner can also show legal right to occupy an area by proof of a ruling giving prescriptive rights of occupancy.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, NCDOT calculates eligibility based on length or individual conflict location, as follows:

- Length: NCDOT uses this method for longitudinal installations. If it is feasible to divide the relocation into large segments where responsibility for the relocation cost is clear, the participation percentage results from dividing the cost of the relocation that is reimbursable by the total cost of the facility to be relocated. If it is not feasible to divide the relocation into large segments, NCDOT negotiates the allocation of costs with the utility owner. NCDOT also uses the length method for crossings that do not include appurtenances that divide the installation into straight line segments.
- Individual conflict location: NCDOT uses this method for crossings. If the utility crossing has points of conflict both inside and outside existing ROW, NCDOT is

responsible for the relocation costs if the crossing meets all the following conditions:

- At least one point outside the existing ROW is eligible for reimbursement and anchors straight linear segments (e.g., a pole or an access box).
- The relocation that clears the conflicts for which NCDOT is responsible also clears the conflicts for which the utility owner is responsible.
- The conflicts for which the utility owner is responsible are cleared in the same phase as the conflicts for which NCDOT is responsible.

Normally, the utility relocation cost only includes the portion of the work inside the proposed ROW. However, if it is necessary to perform utility work outside the project limits, NCDOT considers reimbursing that cost, but NCDOT requires utility owners to provide adequate documentation supporting their case.

For both methods, NCDOT calculates eligibility based on the allocation that was used for the utility agreement. This eligibility stays the same for the next stages unless a notable change in the relocation scope or underlying determination of cost responsibilities occurs.

North Dakota

At the North Dakota Department of Transportation (NDDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest.
- A utility facility had prior rights before 1959 and is inside 100 ft from the centerline of a state highway or within 75 ft from the centerline of a county road.

A 1959 state law established a setback requirement for utility owners. The requirement was to request approval for any installation within 100 ft from the centerline of a state highway (or 75 ft from the centerline of a county road). Any utility facility already in place within this distance before 1959 acquired prior rights, making a future utility relocation reimbursable. Any new installation after the law was enacted would require permission from NDDOT or a county, and a future utility relocation would not be reimbursable. For example, assume NDDOT has a 60-ft ROW from the centerline, and a highway project is expanding the ROW to 90 ft. An existing utility facility that was in place at 61 ft before 1959 has prior rights, and its relocation is reimbursable. However, another utility facility that was installed at 61 ft after 1959 does not have prior rights, and its relocation is not reimbursable.

NDDOT does not encounter delays due to prescriptive right claims. NDDOT pays for utility relocations for owners that have prior rights. The 1959 law concerning 100-ft setbacks clears up most prescriptive right claim issues.

Ohio

At the Ohio Department of Transportation (ODOT), utility relocations are reimbursable in the following cases:

- For utility facilities that are privately owned (either by private entities, including individuals, companies, or corporations, or held by public stockholders and regulated by the Public Utilities Commission of Ohio):
    - A utility facility occupies private property, and the utility owner has a valid easement or owns the property in fee simple.
    - A utility facility occupies private property, and the utility owner has a valid prescriptive right.
    - A utility facility occupies the public ROW and has an easement that predates the state's rights.
- For utility facilities that are owned by governmental agencies:
    - A utility facility is on property owned by the governmental agency that owns the utility facility.
    - A utility facility occupies private property, and the governmental agency has a valid easement.
    - A utility facility is on public ROW (including state road ROW) inside the corporation limits of the governmental agency that owns the utility facility.
    - A utility facility is on public ROW outside the jurisdiction of the governmental agency that owns the utility facility, and the utility owner has a compensable agreement with the governmental agency having jurisdiction.

ODOT complies with existing prescriptive right laws in Ohio. Prescriptive right claims do not receive special treatment at the department. Property interests are determined based on the order in which facilities were constructed.

For the participation percentage calculation, ODOT includes all existing facilities affected by the highway project between the tie-in points of the relocated facility, even if the tie-in points are inside private property. For utility relocations that are reimbursable, ODOT calculates eligibility based on pole count, length, or cost, as follows:

- Pole count: ODOT uses this method for aerial facilities that involve pole relocations caused by the highway project. The participation percentage results from dividing the number of poles that are reimbursable by the total number of poles to be relocated.
- Length: ODOT uses this method for underground facilities affected by the highway project. The participation percentage results from dividing the length of cable, conduit, or pipe (as appropriate) that are reimbursable by the total length of facility to be relocated up to the tie-in points.
- Cost: ODOT uses this method for utility relocations when only a segment of the existing facility is eligible for reimbursement. The participation percentage results

from dividing the cost of the utility relocation that is reimbursable by the total cost of the utility relocation.

ODOT calculates participation percentages separately for unlike facilities (i.e., facilities that are different such as aerial and underground or transmission and distribution). In addition, ODOT does not combine the participation percentages for unlike facilities. The utility relocation cost includes the cost to make the utility facility functional between the tie-in points, including work inside private property.

For the pole count, length, and cost methods, ODOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages, unless a substantial number of facilities are affected after completing the initial cost estimate.

Oklahoma

At the Oklahoma Department of Transportation, utility relocations are reimbursable in the following cases:

- A utility facility has an existing or a prior property interest.
- A utility facility is owned by a rural water district, a nonprofit water corporation, or a municipal public water system in a municipality with a population of 10,000 or less.

Oregon

At the Oregon Department of Transportation (OrDOT), utility relocations are reimbursable if the utility facility has a compensable property interest at its present location (e.g., an easement, fee title, or a judgment of prescriptive rights).

OrDOT manages prescriptive easements in two ways. The first option is to allow the affected utility installation to stay at their location (with a small vertical adjustment as needed) by using an “X” permit. The second option is for the utility owner to acquire a replacement easement and for OrDOT to reimburse the utility owner for that acquisition. OrDOT does not recognize a prescriptive easement for a utility facility that occupies the ROW if the utility owner cannot prove (via a recorded instrument) the utility facility was there prior to OrDOT acquiring the ROW.

Pennsylvania

At the Pennsylvania Department of Transportation (PennDOT), utility relocations are reimbursable in the following cases:

- A utility facility is located on private property and has a property interest at that location.
- A utility facility is located on public ROW and one of the following conditions applies:

- The utility owner provides evidence that their property right was acquired prior to the date of establishment of the public ROW, and the utility owner never received compensation for or received a substitute ROW (as a replacement ROW is called in Pennsylvania).
- A utility facility has a private ROW status as defined by a previous agreement with the utility owner.
- A utility facility is owned by a municipality or a municipal authority, and the utility facility meets the requirements of 36 Pa. Stat. § 670-412.1, or the utility facility is a publicly owned water or sanitary sewer installation that meets the requirements of 74 Pa. Cons. Stat. § 9501. Reimbursement involves cost sharing between PennDOT and the utility owner. In general, the cost to acquire a substitute ROW is the responsibility of the local jurisdiction.
- A utility facility is a valve cover, or another surface device, and the facility meets the requirements of 71 Pa. Stat. § 515(g).

PennDOT has an incentive program with utility owners based on cost sharing. Cost sharing is based on meeting accelerated project milestones during the utility coordination process—up to 75 percent cost sharing in the case of municipalities and up to 50 percent in the case of private water and sewer utilities that provide service to the public. If a utility owner does not meet milestones, they lose the cost sharing. If a project is an interstate project, PennDOT increases the cost sharing to 90 percent. In some cases, cost sharing involves including the design in the highway design contract and the physical relocation in the highway construction contract. Utility relocations are also reimbursable in response to Public Utility Commission orders.

PennDOT recognizes prescriptive easements for continued occupation of a property for at least 20 years. Likewise, utility owners must submit documentation about any prior rights.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, PennDOT calculates eligibility based on facility count or length, as follows:

- Facility count: PennDOT uses this method for individual facilities such as poles and for facilities attached to them. The proration results from dividing the number of individual facilities that are affected by the project and are reimbursable by the total number of facilities to be relocated. For the purposes of the calculation, PennDOT does not include facilities such as push poles, guy poles, service poles, or down poles. In the calculation, PennDOT only includes poles that have aerial utility facilities attached to the poles.
- Length: PennDOT uses this method for underground linear facilities and for facilities attached to highway structures. The proration results from dividing the length of cable, conduit, or pipe (as appropriate) that is affected by the project and is reimbursable by the total length of facility to be relocated. PennDOT does not

include service lines or structures such as valves, access boxes, or meter pits in the percentage calculation.

PennDOT calculates prorations at the utility conflict level. PennDOT tracks individual conflicts using the Utility Relocation Management System (URMS), which PennDOT started using in 2020. Before URMS, PennDOT also used a third method to calculate reimbursement eligibility, which enabled officials to calculate a single, hybrid percentage for groups of poles and linear installations. URMS did not support this method, requiring utility coordinators to enter individual utility conflicts and calculating reimbursement eligibility for each utility conflict.

URMS also enables officials to prepare utility agreements. In practice, PennDOT has separate agreements for different utility services (e.g., water, electric, or communications) and different facility types (i.e., transmission or distribution). Each agreement includes all the utility conflicts that belong to a specific utility service and service level (e.g., electric distribution).

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property. For utility relocations that are included in the highway contract, PennDOT would execute a temporary construction easement to enable the highway contractor to work outside the proposed ROW.

For both facility count and length methods, PennDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages, unless a substantial number of facilities are affected after completing the initial cost estimate.

Rhode Island

At the Rhode Island Department of Transportation, utility relocations are reimbursable if they are necessary for a federal-aid highway project.

South Carolina

At the South Carolina Department of Transportation (SCDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a prior property interest.
- A utility facility is owned by a water or sewer utility owner with 10,000 or fewer connections and serving a population of 30,000 or less. In that case, eligible utility relocation costs are 100 percent reimbursable up to 4 percent of the original construction bid amount.
- If more than one large public water or sewer utility owner must relocate lines, eligible utility relocation costs of up to 4 percent of the original construction bid amount are divided pro rata among the utility owners.

- If a highway project impacts both large and small public water and sewer utility owners, all eligible utility relocation costs for small utility owners are 100 percent reimbursable (up to 4.5 percent of the original construction bid amount). Any remaining funds—up to 4.5 percent of the original construction bid amount—are divided pro rata among the large utility owners.

For water or sewer utility relocations, the following expenses are not included in the utility agreement: engineering services, mobilization, clearing and grubbing, traffic control, performance and payment bonds, abandonment or flowable fill under 10 inches unless requested by another utility owner, or contingencies. SCDOT uses a separate utility agreement for engineering services, which also includes items such as inspection, supervision, coordination, and mapping.

SCDOT recognizes prescriptive right claims only in certain situations. Utility owners must provide written documentation their facilities were there before the road was built. Very few utility owners engage in this process.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, SCDOT calculates eligibility based on pole count, length, or individual conflict location, as follows:

- Pole count: SCDOT uses this method for aerial facilities that involve pole relocations. The participation percentage results from dividing the number of poles that are reimbursable by the total number of poles to be relocated. On occasion, a pole ends up having too much "value," which results in SCDOT and the utility owner arriving at an agreed upon percentage.
- Length: SCDOT uses this method, primarily for underground facilities. The participation percentage results from dividing the length of cable, conduit, or pipe (as appropriate) that is reimbursable by the total length of facility to be relocated.
- Individual conflict location: SCDOT uses this method on long projects for which agreements are developed separately for each conflict location, resulting in multiple agreements per utility owner.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property.

For all three methods, SCDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages.

South Dakota

At the South Dakota Department of Transportation (SDDOT), utility facilities that have a property interest or prior right are reimbursable for the cost of relocation and the

replacement ROW. Occasionally, other utility facilities are also reimbursable depending on the specific agreement the department had previously made with the utility owner.

SDDOT does not recognize prescriptive right claims against the state. On private land, SDDOT assumes that utility facilities have an easement (i.e., the department does not require documentation from utility owners to prove they have an easement). SDDOT reimburses for the cost to relocate and, normally, for the cost to replace the easement. In some cases, SDDOT does not reimburse for the replacement easement (e.g., if the easement automatically expires once the utility facility no longer occupies the land). With blanket easements, which are common, the easement is still valid if the utility facility is inside the same property. As a result, SDDOT would not reimburse for the replacement easement.

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, SDDOT calculates eligibility based on pole count or length, as follows:

- Pole count: SDDOT uses this method for aerial facilities that involve pole relocations. The participation percentage results from dividing the number of poles that are reimbursable by the total number of poles to be relocated.
- Length: SDDOT uses this method, primarily for underground facilities. The participation percentage results from dividing the length of cable, conduit, or pipe (as appropriate) that is reimbursable by the total length of facility to be relocated. SDDOT measures lengths in a CAD environment based on the results of the project survey, which often relies on 811 marks, particularly in rural areas. In urban areas, it is more common to conduct a subsurface utility engineering (SUE) investigation. Sometimes, survey-based lengths vary with respect to the utility owner's records, but SDDOT lets utility owners review the numbers.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property. SDDOT reviews each case individually.

For both methods, SDDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages. SDDOT reimburses based on actual costs affected by the participation percentage.

Tennessee

At the Tennessee Department of Transportation (TDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest.
- A utility facility is in the public ROW by permit and certain conditions apply per what is known locally as Chapter 86. (Chapter 86 refers to Tenn. Code Ann. §54-5-804 as amended by Public Chapter 86 of the 2003 Acts of the Tennessee General

Assembly.) As part of Chapter 86, utility relocations are reimbursable provided the utility owner prepares and submits utility relocation plans, schedule, cost estimate per an agreed schedule, and the relocation is either included in the highway construction contract or moved prior to construction for grade and drainage projects and bridge replacement projects. Reimbursement levels are as follows:
    - Relocation prior to letting: 50 percent for utility facilities owned by municipalities, utility districts, or utility cooperatives. All other facilities are reimbursable at 25 percent.
    - Relocation in the highway contract: 100 percent for utility facilities owned by municipalities, utility districts, or utility cooperatives. All other facilities are reimbursable at 75 percent.
    - Reimbursements are capped at $1.75 million.
- A utility facility requires a secondary relocation as part of the same project.

TDOT recognizes prescriptive right claims. In general, TDOT pays for the relocation, not for a replacement easement. Under some circumstances, utility owners claim prescriptive rights against the state. Currently, this is a gray area in Tennessee.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, TDOT calculates eligibility based on pole count, length, or cost, as follows:

- Pole count: TDOT uses this method for aerial facilities that involve pole relocations. The participation percentage results from dividing the number of poles that are reimbursable by the total number of poles to be relocated.
- Length: TDOT uses this method for underground and aboveground facilities. The participation percentage results from dividing the length of cable, conduit, or pipe (as appropriate) that is reimbursable by the total length of facility to be relocated.
- Cost: TDOT uses this method in situations in which the utility owner determines it is more advantageous to calculate the cost for reimbursable components. The participation percentage results from dividing the reimbursable cost by the total cost of the relocation. This method is rare.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property. TDOT reviews the justification for any work outside the proposed ROW and rejects proposals that are not actually needed to make the utility functional again. An example is requiring the installation of a new splice box at or near the proposed ROW instead of approving a replacement fiber optic line connecting to an existing splice box far away from the project location on the basis that current technologies and procedures for installing intermediate splice boxes are much more reliable than a decade ago.

For all three methods, TDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages.

However, TDOT might alter the participation percentage if the scope of work changes significantly. TDOT reimburses based on actual costs affected by the participation percentage.

Texas

At TxDOT, utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right.
- A utility relocation is necessary for an interstate highway project.
- A utility relocation is necessary for a highway that was designated as a toll or turnpike project before September 1, 2005. In that case, the utility relocation is 50 percent reimbursable.
- A utility facility is owned by a water supply or sewer service corporation that is in financial hardship and cannot pay the utility relocation cost (or the payment would affect the utility owner's capability to serve their customers). In addition, the utility owner cannot receive a state infrastructure bank loan.
- A utility facility is owned by a political subdivision that is in financial hardship and cannot pay the utility relocation cost (or the payment would affect the utility owner's capability to serve their customers). In addition, the utility owner is not able to receive a state infrastructure bank loan, or the political subdivision has a population of less than 5,000 and is located in a county that has been included in at least 5 disaster declarations by the president of the United States in the preceding 6 years.
- Any expenditures a utility owner has incurred for design and materials are reimbursable (regardless of eligibility considerations) if TxDOT changes the design, and the utility owner ends up having to re-do what they had already done.

TxDOT does not recognize prescriptive right claims against state property. TxDOT does recognize prescriptive right claims on private property, but TxDOT only reimburses for the engineering and construction costs to complete the relocation, not for the acquisition of a replacement easement.

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, TxDOT calculates eligibility based on pole count, length, or individual facility, as follows:

- Pole count: TxDOT uses this method for individual facilities such as poles and for facilities attached to them. The eligibility ratio results from dividing the number of individual facilities that need to be relocated and that are reimbursable by the total number of facilities to be relocated. For the purposes of the calculation, TxDOT does not include facilities such as guy poles, push braces, or down poles.

- Length: TxDOT uses this method for underground linear facilities and for facilities attached to highway structures. The eligibility ratio results from dividing the length of cable, conduit, or pipe (as appropriate) that is reimbursable by the total length of facility to be relocated.
- Each facility: TxDOT uses this method for individual facilities such as communication hubs and vaults. The eligibility ratio results from dividing the utility relocation cost that is reimbursable by the total utility relocation cost.

TxDOT also uses a composite eligibility ratio (CER) in situations in which a single utility agreement involves utility adjustments at multiple locations, each one having a different eligibility ratio. For example, a wastewater system relocation involves a sanitary sewer having a utility relocation cost of $500,000 and an eligibility ratio of 30 percent, and a treatment plant having a utility relocation cost of $1,000,000 and an eligibility ratio of 100 percent. The CER is calculated as [($500,000 × 0.30) + ($1,000,000 × 1.00)] ÷ $1,500,000 = 76.67 percent.

The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property.

For the three methods, TxDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages. However, TxDOT might alter the compensable ratio if the scope of work changes significantly. TxDOT reimburses based on actual costs affected by the eligibility ratio.

Utah

At the Utah Department of Transportation (UDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right.
- A utility facility is owned or operated by a political subdivision of the state or an exempt water supplier.
- A utility facility is in a public utility easement.
- A utility facility occupies the state ROW. In that case, the reimbursement eligibility is 50 percent. If the utility facility is a crude oil or petroleum product pipeline, the utility owner pays the lesser of (a) 50 percent of the cost to relocate the pipeline or (b) 50 percent of the cost of a structure to protect the pipeline. In this case, UDOT pays the remainder of the cost.

UDOT recognizes prescriptive easement claims. In Utah, prescriptive right claims against the state are not allowed. In this situation, if a utility owner occupies the state ROW but cannot prove they have a prior right, UDOT treats them as having a permit without a property interest.

Small cells are accommodated inside the ROW via permit but are not reimbursable. Communication providers that occupy interstate ROW longitudinally must pay all utility relocation costs.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are eligible for reimbursement, UDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement). The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property.

UDOT calculates eligibility based on the cost estimate that was used for the utility agreement. UDOT reimburses utility owners based on actual relocation costs.

Vermont

At the Vermont Agency of Transportation (VTrans), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest.
- A utility relocation is necessary for a limited-access highway project. Subsequent utility relocations are not reimbursable.
- A utility facility is owned by a municipality and is inside a municipal highway ROW.
- An aerial utility facility is relocated underground. If eligible, after considering options other than placing utility facilities underground, the utility relocation is 50 percent reimbursable.

Prescriptive right claims for aerial infrastructure do not apply in Vermont, including poles or attachments to the poles. Prescriptive right claims for underground infrastructure apply. In this case, the minimum time of continuous occupancy is 20 years.

Virginia

At the Virginia Department of Transportation (VDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right.
- A statutory right makes the utility relocation reimbursable. Table 1 lists the statutory rights and the applicable cases.

Table 1. Statutory Right Applicability for Utility Relocations at VDOT.

Type of Utility Owner	Virginia Code Provision				
	Interstate Project in City or Town	Interstate Project in County	Primary Highway Project	Secondary Highway Project	State Toll Revenue Bond Project
Investor owned	33.2-307	None	None	None	33.2-1701
County electric or gas	33.2-307	33.2-308	33.2-308	33.2-330	33.2-1701
County water or sewer	33.2-307	33.2-308	33.2-308	33.2-330	33.2-1701
City/town electric	33.2-307	None	None	33.2-330	33.2-1701
City/town gas	33.2-307	33.2-308	33.2-308	33.2-330	33.2-1701
City/town water or sewer	33.2-307	33.2-308	33.2-308	33.2-330	33.2-1701
Authority/district water or sewer	33.2-307	33.2-308	33.2-308	33.2-330	33.2-1701

A comprehensive agreement between VDOT and several utility owners provides a framework for utility accommodations and reimbursement eligibility. (In the summer of 2023, VDOT decided to phase out the comprehensive agreement framework.) As part of the agreement, if the highway ROW is at least 110 ft wide, utility facilities are accommodated inside the outer 15 ft of ROW. Under these conditions, reimbursement eligibility for future relocations is 50 percent. This future reimbursement eligibility applies in the following instances:

- A utility facility is located on state ROW, and the utility owner pays for relocating the facility to the 110-ft highway ROW.
- A utility facility is located on an easement or another type of property interest, and the project pays for relocating the facility to the 110-ft highway ROW.

The comprehensive agreement does not apply to interstate or other limited-access ROW highways.

VDOT makes a distinction between utility facilities located on private property and utility facilities that have prior rights:

- Utility facilities on private property: This case applies when a utility facility is located on private property by a recorded easement or other instrument or with the apparent acquiescence of the property owner.
- Utility facilities with prior rights: This case applies when a utility facility is located on VDOT's ROW and has a compensable right to be in that location. Situations include:
    - A utility facility was on private property, and a previous VDOT project encompassed a utility easement on that property.
    - A utility facility was inside the VDOT ROW as part of a previous project, and the utility agreement stated that a future utility relocation would be reimbursable.
    - A utility facility was in the ROW under the terms of a comprehensive agreement between VDOT and utility owners.
    - A utility facility was located on land that was dedicated to VDOT or a locality as a part of a development plan.

In Virginia, cable TV facilities are not considered public utilities and therefore are not reimbursable for utility relocation costs. The reason is that cable TV operators are not required to incorporate as public service corporations. VDOT manages affected cable TV property interests the same way it manages interests for other businesses.

Relocations of communication facilities that occupy the ROW by land use permit are reimbursable. As mentioned below, VDOT collects ROW fees from communication providers. Per Va. Code § 56-468.2, the total amount VDOT can reimburse for relocation expenses cannot exceed the total amount collected in ROW fees in the preceding fiscal year in the locality where the project is located. If a project exhausts the reimbursement limit, the reimbursement is shared among eligible communication providers. Reimbursement eligibility is as follows:

- First three years after completing facility (100 percent).
- Fourth through sixth year after completing facility (50 percent).
- Beginning in the seventh year (0 percent).

Dormant easements (i.e., easements without a facility occupying that easement) do not constitute a property interest that needs compensation. A ruling affecting Stuarts Draft Water Company concluded that a dormant easement, although inside a public road, did not require reimbursing the utility owner when the road profile was lowered. In the eyes of the court, the utility owner did not prove a compensable right.

VDOT honors prescriptive right claims even if the utility owner has not perfected the right. This applies to all relocations regardless of the type of utility facility. In the absence of a recorded instrument documenting the utility owner's property right, VDOT accepts a statement from the utility owner indicating that the property owner has not contested the validity of the occupation of the property from a compensatory standpoint. The statement also indicates that VDOT is not responsible for providing a replacement easement in the utility owner's name unless the utility owner provides an existing recorded instrument in their name. If a utility owner cannot provide documentation of an existing recorded easement, VDOT accommodates the utility facility inside the ROW or into a VDOT shared utility easement.

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, VDOT calculates eligibility based on pole count or length, as follows:

- Pole count: VDOT uses this method for aerial facilities that involve pole relocations. The participation percentage results from dividing the number of poles that are reimbursable by the total number of poles to be relocated. For example, if an aerial utility relocation includes 10 poles, of which 5 poles are reimbursable, the participation percentage is 50 percent. VDOT uses the pole count method for both electric and communication lines.

- Length: VDOT uses this method for underground facilities. The participation percentage results from dividing the length of cable, conduit, or pipe (as appropriate) that is reimbursable by the total length of facility to be relocated. For utility facilities that include both underground and aboveground components, VDOT converts the underground length to an equivalent pole count. For example, if it is necessary to relocate 5,385 ft of a communication line, of which 4,000 ft are on 29 poles and 1,385 ft are underground, the first step involves calculating the average span length for the aerial segment as 4,000 ÷ 29 = 138 ft/pole. The second step involves calculating the equivalent pole count for the underground segment as 1,385 ÷ 138 = 10 poles.
- Each facility: VDOT uses this method for individual components that are large (e.g., a large communication vault) but the length of the line is short. In this case, VDOT weighs the component to reflect the percentage that is reimbursable.

The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property.

For the three methods, VDOT calculates eligibility based on the cost determination made at the utility field inspection meeting during the design phase. This eligibility stays the same for the next stages.

Washington

At the Washington State Department of Transportation (WSDOT), utility relocations are reimbursable in the following cases:

- A utility facility is inside the existing ROW by easement. In that case, reimbursement eligibility depends on the terms and conditions of the easement. Typically, WSDOT is responsible for the cost.
- A utility facility is located on private property by easement. In that case, the utility relocation is reimbursable and WSDOT is responsible for the cost.
- A utility facility is municipally owned and is inside its own municipal limits. If the utility facility is inside another city limit, the utility relocation is not reimbursable. In addition, if city-owned utility facilities are inside state limited-access areas, the city is responsible for the utility relocation costs. WSDOT does not pay to relocate utility facilities located in a public ROW by permit or franchise.
- A prior agreement between WSDOT and a utility owner establishes how WSDOT will compensate utility owners. For example, an agreement will require WSDOT to pay for a one-time utility relocation. In general, reimbursement eligibility is tied to the conditions in the field that gave origin to the utility agreement.

A challenge at WSDOT is differences in utility accommodation practices across the state, which become an issue when it is necessary to relocate utility facilities. For example, a county might have a previous agreement with a utility owner that the county will reimburse

for the cost to relocate a utility facility (even though the utility facility was accommodated by permit). However, if WSDOT needs to acquire the parcel where the utility is located, the department will not consider the relocation to be reimbursable because the utility facility did not have a property interest. In this case, the question is whether the county will reimburse the utility owner based on the prior agreement.

WSDOT does not recognize prescriptive right claims against the state. If a utility facility is found inside the ROW and there is not a permit that authorizes that occupancy, technically WSDOT can charge the utility owner $100 for every day that the occupancy is taking place. For utility facilities that have been inside the ROW for years, WSDOT usually asks the utility owner to formalize a utility permit or a franchise.

For utility relocations that are reimbursable, WSDOT calculates eligibility based on length or cost, as follows:

- Length: This method is the most common method at WSDOT. If the installation is uniform throughout the relocation, WSDOT calculates a participation percentage that results from dividing the length of facility that is reimbursable by the total length of facility to be relocated. For example, if 1,000 ft of pipe are in conflict and need to be relocated, of which 600 ft are reimbursable, the participation percentage is 60 percent. If the installation includes high-cost features (e.g., vaults or pump stations), it is common to calculate the participation percentage using the cost associated with each segment, including both linear elements and individual features inside those segments.
- Cost: WSDOT sometimes uses this method when it is necessary to separate cost estimates for reimbursable work and non-reimbursable work to address disparity issues related to high-cost items at specific locations (e.g., a communication hub that accounts for a substantial percentage of the total utility relocation cost). For these items, WSDOT calculates a participation percentage that results from dividing the part of the cost estimate that is reimbursable by the total cost to relocate the items.

The usual policy at WSDOT is that eligibility calculations only include facilities inside the proposed ROW. By extension, the utility relocation cost only includes the portion of the work inside the proposed ROW. In practice, WSDOT manages reimbursement eligibility considerations for work on private property on a case-by-case basis. In addition, because of the differences in utility accommodation practices across the state, WSDOT performs an extra level of due diligence during scoping to verify whether WSDOT is responsible for utility relocation costs. Real-world cases fall somewhere between the following two scenarios:

- A utility facility is inside the existing ROW, WSDOT is not acquiring adjacent ROW, and the relocation requires work on private property. In this case, the participation

percentage is zero, and the utility owner is 100 percent responsible for the utility relocation cost. WSDOT's participation percentage is zero.
- A utility facility has a property interest on land WSDOT needs for the highway project, none of the utility facility is inside the existing ROW, and the relocation requires work on private property. In this case, the utility owner is in a better position to advocate having the entire utility relocation fully reimbursed, including the segment inside the proposed ROW and any work needed on private property. Whenever possible, WSDOT tries to limit the eligibility consideration to the proposed ROW.

WSDOT calculates reimbursement eligibility based on the estimated quantities that were used for the utility agreement. This percentage stays the same for the next stages. WSDOT reimburses based on actual costs affected by the participation percentage. In recent years, the number of cases in which the actual cost differed from the initial estimate has increased, leading to an increase in the number of change orders and supplemental agreements. This issue affects both situations in which the utility relocation was reimbursable and situations in which the utility relocation was non-reimbursable, but the relocation was included in the highway contract.

West Virginia

At the West Virginia Department of Transportation (WVDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right.
- A utility facility is owned by a county or municipality and is inside the highway ROW.
- A utility facility is privately owned and needs to be relocated more than once because of highway project design or construction changes.
- A utility facility is inside the ROW of a highway construction project financed by proceeds of bonds or notes before July 2021. In this case, 15 percent of the relocation costs are reimbursable.

In 2018, a new law in West Virginia simplified the definition of utilities (see Section 17-2A-17a of the West Virginia Code). Previously, a distinction existed between publicly owned utilities and privately owned utilities. With the new law, there are just utilities. However, for reimbursement eligibility purposes, a difference still exists between publicly owned utilities and privately owned utilities.

WVDOT recognizes prescriptive right claims for utility facilities located on private property, provided the facility has been at least 10 years at the same location, undisputed by the property owner. WVDOT does not accept prescriptive right claims against state property.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, WVDOT calculates a reimbursement percentage by dividing the existing

length of utility facilities that are reimbursable by the total length of existing facilities that need to be relocated. For utility relocations that are part of a highway project financed by bonds (see above), WVDOT reimbursement percentage is 15 percent for facilities inside the existing ROW. The reimbursement percentage is 100 percent for facilities located outside the existing ROW.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property.

WVDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages.

Wisconsin

At the Wisconsin Department of Transportation (WisDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right.
- A utility facility is owned by a municipality and is inside publicly held land required for a freeway project. The utility relocation is 90 percent reimbursable. The utility relocation is 100 percent reimbursable if the utility facility is located outside the existing ROW but inside the proposed ROW and has a property interest.
- A utility facility needs to be relocated more than once because of changes to the project design.

WisDOT recognizes prescriptive right claims against private property if the utility facility has occupied the property continuously for 10 years (if it is a domestic utility owner) or 20 years (if it is a foreign utility owner). WisDOT requires proof the utility facility has been in place on private property for the required amount of time but does not require the utility owner to perfect the prescriptive right claim.

Existing utility facilities outside the proposed ROW that are affected by the highway project do not contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, WisDOT calculates eligibility based on pole count, length, or special facilities, as follows:

- Pole count: WisDOT uses this method for aerial facilities that involve pole relocations. The compensable ratio results from using the poles that are in conflict or affected by the project and is derived at by dividing the number of poles that are reimbursable by the total number of poles to be relocated. WisDOT determines eligibility based on the location of the center of the pole. If the center of the pole is on the ROW line or inside the existing ROW, the entire pole is considered non-reimbursable. In addition, WisDOT does not consider cable length or pole underbuilds (i.e., a type of installation that involves placing distribution lines underneath transmission lines to reduce the number of poles). WisDOT does not

include poles located outside the project limits or on private property outside the proposed ROW in the compensable ratio calculation. However, those poles are included in the total utility relocation cost.

- Length: WisDOT uses this method, primarily for underground facilities. The compensable ratio results from using the length of underground facility in conflict or affected by the project and is derived at by dividing the length of cable, conduit, or pipe (as appropriate) that is reimbursable by the total length of facility to be relocated. WisDOT does not include underground facilities located outside the project limits or on private property outside the proposed ROW in the compensable ratio calculation. However, those underground facilities are included in the total utility relocation cost.
- Special facility: WisDOT uses this method on large facilities such as transmission towers, large steel poles, or vaults. The compensable ratio results from dividing the footprint area that falls outside the existing ROW by the total area associated with the facility that is in conflict or affected by the project. For example, if 3 legs of a 4-legged transmission tower are outside the existing ROW, the compensable ratio is 75 percent.

WisDOT does not include service drops or lines in the eligibility calculation. WisDOT includes the cost for service drops in the total utility relocation cost and reimburses for this work based on the corresponding reimbursement compensable ratio. Exceptions to this policy include the following:

- If none of a distribution line is on private property, the corresponding service drops are not reimbursable.
- If the utility owner needs to acquire an easement specifically for the service drop, the service drop is reimbursable.
- Service drops for factories or public buildings may be reimbursable because they more closely resemble distribution facilities than service connections.

The utility relocation cost includes the cost to make the utility facility functional, including work inside private property. However, there is a point beyond which WisDOT begins to consider the possibility that some of the work on private property might need to be considered elective betterment, in which case the corresponding cost would be non-reimbursable. For example, a few poles on a line would not constitute betterment. However, if a utility owner wants to replace 2 mi of an electric line when only 0.5 mi is in conflict, WisDOT would consider the remaining 1.5 mi that are not in conflict to be non-reimbursable.

For water and sewer facilities, WisDOT does not calculate a compensable ratio. The utility agreement only includes the reimbursable portion of work inside the proposed ROW (which is reimbursable at 100 percent). WisDOT reimburses 90 percent for the portion of work inside the existing ROW when required for a freeway project. Water and sewer work is

not reimbursable (i.e., reimbursable at 0 percent) if the facility is not in conflict or affected by the project.

For all three methods, WisDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. This eligibility stays the same for the next stages. However, WisDOT might alter the compensable ratio via a change order if the scope of work changes significantly or if the utility facility needs to be relocated again (see above).

Wyoming

At the Wyoming Department of Transportation (WYDOT), utility relocations are reimbursable in the following cases:

- A utility facility has a property interest or a prior right.
- A utility facility is inside the ROW of a federal-aid highway system under a license or license agreement, and the utility owner provides service to less than 15,000 customers. In that case, the reimbursement eligibility is 50 percent. Crossings are only reimbursable if they are part of a parallel line being relocated and the utility facility is inside the ROW.

Existing utility facilities outside the proposed ROW that are affected by the highway project contribute to the reimbursement eligibility calculation. For utility relocations that are reimbursable, WYDOT calculates eligibility based on reimbursable costs (assuming an in-kind replacement).

The utility relocation cost includes the cost to make the utility facility functional again, including any work inside private property. An example of this situation is if a pipeline needs to go deeper, but in the process an additional adjustment on private property is needed so that the pipeline profile does not exceed a certain angle. Another example is fiber optic splicing, which might extend well into adjacent property until reaching the next splice box.

WYDOT calculates eligibility based on the estimated quantities that were used for the utility agreement. WYDOT reimburses utility owners based on actual relocation costs.

GENERAL TRENDS

Table 2 shows a summary of practices from state DOTs that provided feedback. High-level trends based on the responses from 33 state DOTs include the following:

- The pole count method is used by 18 state DOTs (or 54 percent).
- The length method is used by 23 state DOTs (or 70 percent).
- The cost method is used by 27 state DOTs (or 82 percent). Of this total:
    - A reimbursement percentage is used by 12 state DOTs (or 36 percent), and eligible costs are used by 15 state DOTs (or 46 percent).

    - Only eligible costs (not reimbursement percentage) are used for reimbursement eligibility calculations by 10 state DOTs (or 37 percent).
- Eligibility is calculated to include affected facilities outside the proposed ROW by 24 state DOTs (or 73 percent).
- Work on private property is included in the utility relocation cost estimate by 30 state DOTs (or 91 percent).
- The reimbursement eligibility is considered for review after utility owners submit actual utility relocation costs by 23 state DOTs (or 70 percent).

In general, state DOTs that use reimbursement percentages using the pole count and length methods tend to experience similar issues and challenges as TxDOT. By comparison, state DOTs that only use eligible costs (i.e., not reimbursement percentages) indicated they are satisfied with this method because it is straightforward to understand and use. Lastly, state DOTs that do not include affected utility facilities on private land tend to experience more complaints from the utility industry as state DOTs that calculate eligibility including affected facilities outside the proposed ROW.

Table 2. Methods to Determine Reimbursement Eligibility.

State	Pole Count	Length	Cost (Total, per Facility, or per Conflict Location)	Eligibility Includes Affected Facilities Outside Proposed ROW	Cost Estimate Includes Work on Private Property	Eligibility Review Possible After Executing Utility Agreement
Alabama	—	—	Eligible cost	No	No	No
Alaska	—	—	Eligible cost	Yes	Yes	Yes
Arkansas	Percentage	Percentage	Percentage	Yes	Yes	Yes
California	Percentage	Percentage	Percentage	No	Yes	No (Assumed)
Colorado	—	—	Eligible cost	Yes	Yes	Yes
Connecticut	—	—	Percentage	Yes	Yes	No
Delaware	Percentage	Percentage	Eligible cost	Yes	Yes	No
Indiana	—	Percentage	Eligible cost	Yes	Yes	No for length; yes for cost
Iowa	Percentage	Percentage	—	Yes	Yes	Yes
Kentucky	Percentage	Percentage	Percentage	Yes	Yes	Yes
Louisiana	Percentage	Percentage	Eligible cost	No (Assumed)	Yes	Yes
Maine	—	—	Eligible cost	No	No	Yes
Maryland	Percentage	Percentage	Percentage	Yes	Yes	Yes
Massachusetts	—	—	Eligible cost	Yes	Yes	Yes
Michigan	—	—	Eligible cost	Yes	Yes	Yes
Mississippi	Percentage	Percentage		Yes	Yes	Yes
Missouri	Percentage	Percentage	Percentage	Yes	Yes	No
Montana	Percentage	Percentage		Yes	Yes	Yes
Nevada	—	Percentage	Eligible cost	Yes	Yes	Yes
New Mexico	—	—	Eligible cost	No	No	Yes
North Carolina	—	Percentage	Eligible cost	Yes	Yes	Yes
Ohio	Percentage	Percentage	Percentage	Yes	Yes	Yes
Pennsylvania	Percentage	Percentage	—	Yes	Yes	Yes
South Carolina	Percentage	Percentage	Eligible cost	Yes	Yes	No
South Dakota	Percentage	Percentage	—	No (Assumed)	Yes	No (Assumed)

State	Pole Count	Length	Cost (Total, per Facility, or per Conflict Location)	Eligibility Includes Affected Facilities Outside Proposed ROW	Cost Estimate Includes Work on Private Property	Eligibility Review Possible After Executing Utility Agreement
Tennessee	Percentage	Percentage	Percentage	Yes	Yes	Yes
Texas	Percentage	Percentage	Percentage	No	Yes	Yes
Utah	—	—	Eligible cost	Yes	Yes	Yes
Virginia	Percentage	Percentage	Percentage	No	Yes	No
Washington	—	Percentage	Percentage	Yes	Yes	Yes
West Virginia	—	Percentage	—	Yes	Yes	No
Wisconsin	Percentage	Percentage	Percentage	No	Yes	Yes
Wyoming	—	—	Eligible cost	Yes	Yes	Yes
Total	**18**	**23**	**27** **12 (Percentage)** **15 (Eligible cost)**	**24 (Yes)** **9 (No, including Assumed)**	**30 (Yes)** **3 (No)**	**24 (Yes)** **9 (No)**

Note: An em dash (—) indicates that the state DOT does not use the method.

CHAPTER 3. BASELINE ANALYSIS

PROJECTS AND UTILITY AGREEMENTS

The research team received a spreadsheet from the Right of Way Division that listed projects with letting dates beginning in fiscal year 2019. Older projects were not of interest because the Right of Way Division had not yet started to implement a series of recent strategies to improve the preparation and assembly of utility agreements. It was also around this time that TxDOTCONNECT went online.

The research team selected 79 agreements from a list of 2,085 reimbursable agreements, trying to capture a variety of utility types, relocation costs, eligibility ratios, and geographic regions. The research team received and analyzed 60 utility agreements and companion documents. Table 3 shows a summary of utility agreements the research team reviewed.

Table 3. Summary of Projects and Utility Agreements.

District	Highway	Utility Type	Alignment	ER Method	CER	ER
Amarillo	SL 335	Gas	Mixed	Length	No	91.79%
Amarillo	SL 335	Gas	Crossing	Length	No	69.71%
Amarillo	SL 335	Gas	Longitudinal	Length	No	97.24%
Amarillo	US 54	Water and sewer	Mixed	Facility	Yes	95.13%
Amarillo	US 60	Water and sewer	Mixed	Facility	Yes	80.89%
Atlanta	IH 30	Communications	Longitudinal	Length	No	100.00%
Atlanta	SL 255	Electric	Crossing	Pole count	No	80.00%
Atlanta	US 59	Gas	Crossing	Length	No	49.23%
Atlanta	US 59	Water	Longitudinal	Length	No	66.51%
Austin	IH 35	Communications	Mixed	Cost	No	100.00%
Austin	IH 35	Communications	Mixed	Cost	No	100.00%
Beaumont	FM 565	Gas	Crossing	Length	No	81.25%
Beaumont	US 69	Gas	Crossing	Length	No	68.32%
Bryan	FM 60	Electric	Mixed	Pole count	No	84.60%
Bryan	IH 45	Electric	Crossing	Cost	No	100.00%
Bryan	SH 21	Gas	Crossing	Length	Yes	74.87%
Bryan	SH 21	Gas	Crossing	Length	No	66.66%
Brownwood	US 190	Water	Longitudinal	Length	No	56.56%
Dallas	IH 30	Communications	Mixed	Cost	No	100.00%
Dallas	IH 30	Communications	Mixed	Cost	No	100.00%
Dallas	SH 121	Water	Mixed	Length	Yes	76.43%
Dallas	SH 205	Water	Mixed	Length	Yes	59.15%
Dallas	SH 5	Water	Mixed	Length	Yes	51.02%
Dallas	US 380	Water	Mixed	Length	No	94.00%
Dallas	US 67	Gas	Crossing	Length	Yes	39.21%

District	Highway	Utility Type	Alignment	ER Method	CER	ER
El Paso	US 62	Communications	Mixed	Length	Yes	86.94%
El Paso	US 62	Electric	Crossing	Facility	No	100.00%
Houston	FM 1463	Water	Longitudinal	Length	No	99.15%
Houston	FM 1960	Communications	Mixed	Length	No	92.98%
Houston	FM 1960	Water	Mixed	Length	No	45.32%
Houston	FM 1960	Communications	Mixed	Cost	No	60.43%
Houston	FM 1960	Electric	Longitudinal	Pole count	No	100.00%
Houston	SH 36	Gas	Crossing	Length	No	61.53%
Lubbock	SL 88	Sewer	Mixed	Length	No	97.91%
Lufkin	US 59	Electric	Mixed	Pole count	No	45.76%
Laredo	US 59	Gas	Mixed	Cost	Yes	5.86%
Paris	IH 30	Water	Mixed	Length	No	100.00%
Paris	SH 276	Electric	Mixed	Pole count	No	78.57%
Pharr	FM 494	Gas	Crossing	Length	No	100.00%
San Antonio	SH 158	Electric	Mixed	Pole count	No	11.54%
San Antonio	FM 1103	Water	Mixed	Length	No	90.85%
San Antonio	FM 3351	Water	Longitudinal	Length	No	60.95%
San Antonio	IH 10	Water	Crossing	Cost	No	100.00%
San Antonio	IH 410	Electric	Longitudinal	Cost	No	100.00%
San Antonio	SL 1604	Water	Mixed	Length	No	13.08%
Tyler	FM 16	Water	Longitudinal	Length	No	81.68%
Tyler	FM 2206	Water	Crossing	Length	No	70.60%
Tyler	FM 2275	Water and sewer	Mixed	Length	Yes	44.07%
Tyler	SH 198	Water	Mixed	Cost	No	100.00%
Tyler	US 175	Gas	Crossing	Length	No	62.36%
Tyler	US 175	Gas	Crossing	Length	No	59.67%
Tyler	US 175	Gas	Crossing	Length	No	74.0968%
Tyler	US 175	Water	Longitudinal	Length	No	85.56%
Tyler	US 69	Communications	Mixed	Length	No	18.22%
Tyler	SH 135	Water	Mixed	Length	No	93.00%
Waco	IH 35	Electric	Crossing	Cost	No	100.00%
Yoakum	SH 35	Electric	Crossing	Pole count	No	50.00%
Yoakum	US 59	Water	Longitudinal	Length	No	65.30%
Yoakum	US 77	Gas	Crossing	Length	Yes	82.15%
Yoakum	US 77	Electric	Mixed	Pole count	No	97.20%

Table 4 shows the distribution of utility agreements by utility type. The 60 agreements were associated with 19 districts, including metro districts, urban districts, and rural districts. A total of 20 utility agreements had a supplemental agreement. A total of three agreements had an additional supplemental agreement. The supplemental agreements normally addressed changes in the scope of work or relocation cost. In most cases, the eligibility

ratio remained the same. In total, six agreements included changes in the eligibility ratio calculation.

Table 4. Distribution of Utility Agreements by Utility Type.

Utility Type	Count	Percentage
Communications	9	15.0%
Electric	12	20.0%
Gas	16	26.7%
Sewer	1	1.7%
Water	19	31.6%
Water and Sewer	3	5.0%
Total	**60**	**100%**

GENERAL TRENDS

General statistics associated with the 60 utility agreements are as follows:

- Total utility relocation cost: $123,276,375.66
- Total eligible cost for reimbursement: $89,232,503.74
- Average eligibility ratio: 72.38 percent

General statistics associated with the 20 supplemental agreements are as follows:

- Total utility relocation cost: $28,128,202.51
- Total eligible cost: $23,359,767.01
- Average eligibility ratio: 83.05 percent

General statistics associated with the three additional supplemental agreements are as follows:

- Total utility relocation cost: $4,306,371.13
- Total eligible cost: $3,525,653.55
- Average eligibility ratio of supplemental agreements: 81.87 percent

Of the 60 agreements analyzed, 38 agreements used the length method, 8 agreements used the pole count method, 11 agreements used a cost method, and 3 agreements used a method that accounted for each facility separately. Utility owners often used the cost method when the relocation was 100 percent eligible for reimbursement or when the cost to relocate a facility in a private easement was disproportionally high compared to the cost of the entire relocation. For example, a communication provider used this method to calculate the eligibility for relocating a communication line that had complex, expensive components inside a private easement compared to the segment inside the existing ROW. In this case, the length of the line in a private easement was less than 25 percent of the total length that needed relocation.

Three utility agreements (two water and one electric) used the facility method. In these cases, the calculation was based on the number of conflicts identified. Each conflict was managed separately as an independent facility. This methodology facilitated a comprehensive conflict resolution process and enabled a breakdown of relocation costs by conflict, making the review process more expedited.

Of the 60 agreements, 13 agreements included an elective betterment. Eight of these agreements corresponded to water utilities. The high number of agreements that involved elective betterments for water relocations could be an indication that water utility owners (most of them owned by local jurisdictions) have significant budget restrictions that force them to postpone upgrades to their systems as much as possible. From this perspective, highway projects offer an opportunity to upgrade part of their infrastructure.

Only four agreements included salvage credits, of which two agreements were for electric utilities and the other two agreements were for communication facilities. In general, salvage credits were minor compared to the total relocation cost and did not significantly impact TxDOT's share of the relocation cost.

One agreement included both an elective betterment and a salvage credit. For this agreement there was a discrepancy between the eligible cost shown in the agreement and the amount reported in TxDOTCONNECT. In the agreement, the utility owner first applied the salvage credit, then the betterment ratio, and finally the eligibility ratio. In contrast, in TxDOTCONNECT the betterment ratio was applied first, followed by the salvage credit, and finally the eligibility ratio.

Utility agreements that included forced betterments lacked sufficient documentation to support the forced betterment. In some instances, the justification for the forced betterment was only a short paragraph stating the change based on a change in the utility owner's policy.

The research team noticed significant differences in practices with respect to how utility owners prepare and assemble utility agreement packages. Of interest was how different practices affected the research team's ability to understand how utility owners conducted eligibility ratio calculations.

Some plans were effective in showing the location of existing and proposed utility relocations. These plans made an effective use of symbology, colors, and other graphical elements to clearly show the location of existing utility facilities, proposed utility relocations, lengths of eligible facilities (or eligible poles), existing ROW line, and proposed ROW lines. Other plans were too cluttered, lacking critical information to understand the basis of the eligibility ratio calculation. Electric utility relocation plans were often the most difficult plans to understand and follow. These plans included detailed information about the existing and proposed utility facilities (including callouts, conductor cable details, and other appurtenances). However, the plans often did not show basic information about the

highway project (e.g., existing ROW lines, proposed ROW lines, existing edge of pavement, proposed edge of pavement, drainage structures, and utility easements).

Most plans, regardless of utility type, did not adequately show the location of other existing utility facilities. Although this information was not critical to ascertain reimbursement eligibility ratio calculations, it nevertheless provided background and context to the proposed utility relocation. Likewise, most plans did not show the location and extent of the utility conflicts that gave origin to the need to relocate an existing utility facility.

Utility agreements typically showed the total estimated utility relocation cost and the eligibility ratio. As appropriate, they also included the elective betterment ratio, salvage credit, and justification for a forced betterment. Only a few utility agreements showed the estimated eligible cost. In all cases, the research team conducted a manual calculation of the eligible cost and compared the result with the amount shown in the agreement as well as TxDOTCONNECT. In several instances, the amounts differed.

A handful of utility agreements included joint bid relocations. Most of the agreements included copies of the calculation using TxDOT's standard Excel template. However, the numbers shown and the terminology used to label the numbers were not intuitively clear. Part of the reason is that the Excel template mixes eligibility calculations with payment calculations. Understanding the numbers would be easier if the two sets of calculations were shown in two separate sections. The analysis described here only addressed eligibility ratio calculations.

Some of the documentation the research team had opportunity to review included specialists' reviews, both before and after utility agreements were fully executed. These reviews helped the research team better understand issues they noticed with some of the utility agreements and whether these issues were resolved and when (i.e., as part of the utility agreement or a supplemental agreement). Regarding eligibility ratio calculations, reviews often pointed to issues such as plans not clearly showing eligible pipeline lengths, lengths not matching in plans and the calculation table, errors in the eligibility ratio calculation, and missing existing ROW line or proposed ROW line. Reviews also pointed to issues with elective or forced betterment documentation.

CHAPTER 4. COMPARISON OF REIMBURSEMENT ELIGIBILITY CALCULATION METHODOLOGIES

This chapter summarizes the result of the analysis the research team completed to compare methodologies for reimbursement eligibility calculations. The research team used a sample of utility agreements to (a) examine ways to improve on the reimbursement eligibility methodology that was used in the utility agreements and (b) compare methodologies for reimbursement eligibility calculations. The analysis is as complete as possible given the information available. In most cases, the information was sufficient to determine whether it was possible to improve on the eligibility ratio calculation the utility owner used. For comparing methodologies, it was necessary to make certain assumptions, mostly related to the allocation of costs among utility segments or relocation areas.

CASE 1—AMARILLO DISTRICT: SL 335 CONSTRUCTION PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0904-11-058
ROW CSJ: 0904-11-060

The project involved constructing main lanes and frontage roads along SL 335 in Amarillo, from FM 2590 to the Potter County line. Originally, SL 335 was a 2-lane road that ended at SW 34th Avenue. The project went to letting in 2018. The estimated construction cost was $6,566,000.00, which included the frontage roads, not the main lane. (TxDOTCONNECT only shows approximate amounts and dates.) The project included acquisition of ROW, primarily east of the existing SL 335 alignment, and several utility relocations, including electric, gas, water, and wastewater.

Atmos Energy had a 10-inch steel pipeline that interfered with the proposed TxDOT drainage and culvert design at the intersection of West County Road 34/SW 34th Avenue and Helium Road (Figure 1). The resolution strategy included abandoning the existing pipeline in place and installing 2,477 ft of 10-inch steel pipeline and a 10-inch block gate assembly. The construction method was horizontal boring. All utility relocation work was inside the proposed ROW, except for the bore entry and exit points, which were located just a few feet outside the proposed ROW. Atmos estimated the construction to start in October 2018 and end in November 2018.

The relocation was reimbursable except for a short length that was located inside the existing ROW. As Figure 1 shows, Atmos Energy labeled the two segments Conflict 2 and Conflict 3. Atmos Energy calculated the eligibility ratio using the length method by measuring the length of eligible existing pipeline segments. The plans did not clearly show stations or the exact locations where the utility relocation work would be eligible for reimbursement. Based on the length measurements included in the utility agreement, TxDOT's participation was 91.79 percent (Figure 2).

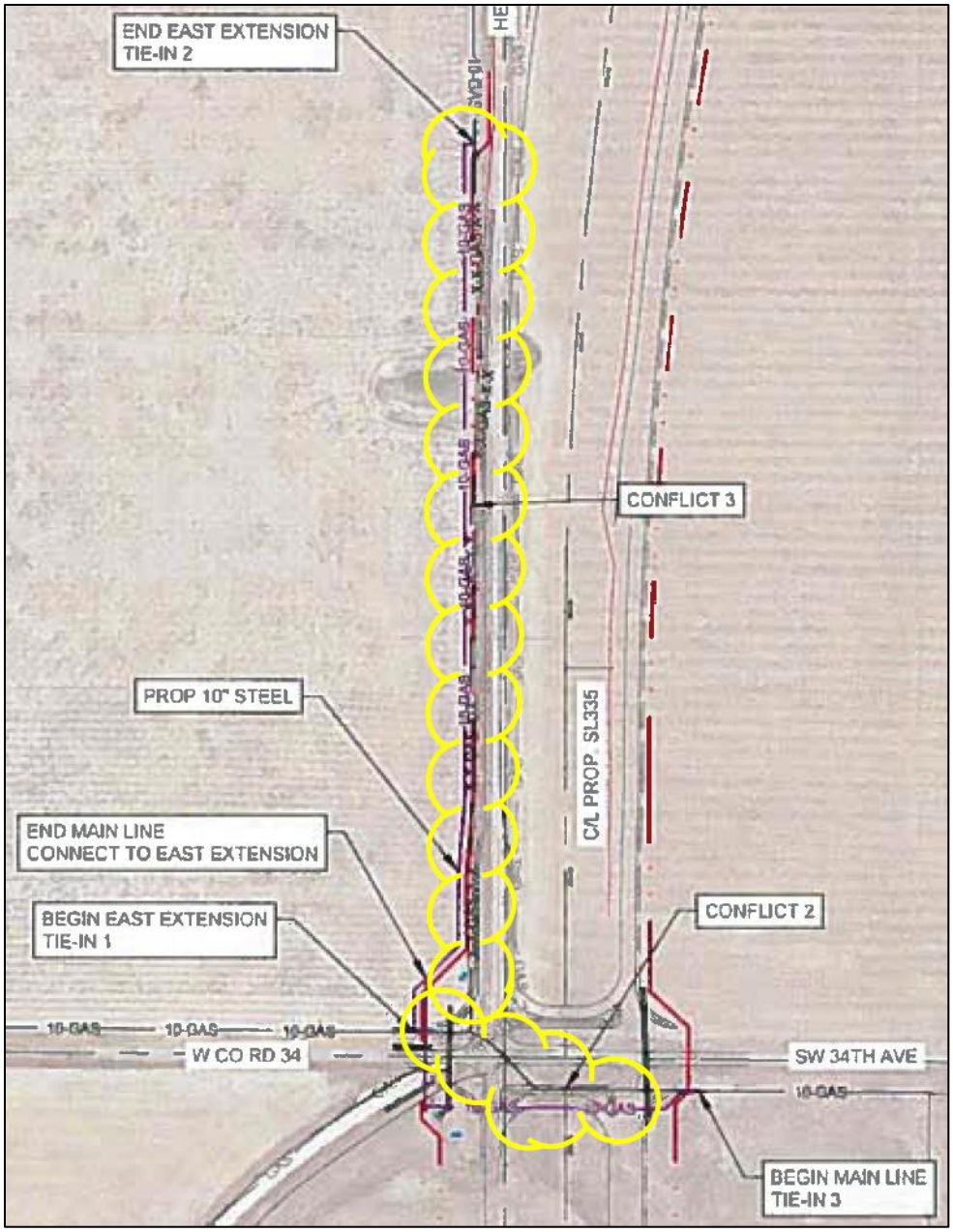


Figure 1. Case 1—Utility Relocation Plan.

Conflict	Total pipe removed/abandoned (LF)	Amount removed in existing Atmos easement (LF)
2	445	380
3	1771	1654
TOTAL	**2216**	**2034**
RATIO	**91.79%**	

Figure 2. Case 1—Reimbursement Eligibility Calculation.

The total utility relocation cost was $973,680.40. The relocation did not include elective betterments or salvage credit that could reduce the total cost. The eligible cost was 0.9179 × $973,680.40 = $893,741.24. The agreement included $75,000 for a replacement easement and $2,000 for temporary construction easements, damages, and restoration. These costs were included in the total cost estimate and were affected by the eligibility ratio. The standard utility agreement was fully executed on October 8, 2018. According to TxDOTCONNECT, Atmos Energy completed the relocation on July 5, 2021.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. However, as mentioned previously, the plans did not clearly show the locations where the utility relocation work would be eligible for reimbursement. Clearly showing this information on the plans would have made the review of the eligibility calculation easier to conduct.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by preparing a cost estimate of the utility relocation work for each segment and by calculating the corresponding eligible cost using the length method. Because the plans did not clearly show the length and extent of the pipeline segments, and the cost estimate in the utility agreement did not provide cost calculations for each segment separately, the research team made the following assumptions based on the aggregated data included in the utility agreement:

- The 2,477 ft of the proposed 10-inch pipe is divided between the Conflict 2 segment (i.e., Segment 2) and the Conflict 3 segment (i.e., Segment 3) in the same proportion as the existing pipeline lengths:
    - Segment 2 length: 2,477 × 445 ÷ 2,216 = 497 ft.
    - Segment 3 length: 2,477 × 1,771 ÷ 2,216 = 1,980 ft.
- All costs (i.e., materials, land rights, company labor, construction costs, contract expenses, and indirect costs) are prorated by length of pipe to be installed.
- The utility agreement included the replacement easement in the reimbursement eligibility calculation (i.e., in compliance with TxDOT's current policy).
- Reimbursement eligibility for Segment 2 is based on the existing easement length (i.e., 380 ÷ 445 = 85.39 percent).
- Reimbursement eligibility for Segment 3 is based on the existing easement length (i.e., 1,654 ÷ 1,771 = 93.39 percent).

A more accurate calculation of costs for each segment would involve measuring quantities (e.g., materials, labor, etc.) separately.

Table 5 summarizes the reimbursement eligibility calculation. The total eligible cost for Segment 2 is $166,966.86. For Segment 3, it is $726,745.20. These amounts would provide the basis for reimbursement by managing each segment separately. The total eligible cost

is $893,712.06, which matches the eligible cost as included in the standard utility agreement. If the utility owner had provided disaggregated costs by segment, the total eligible cost would have been different.

Table 5. Case 1—Alternative Reimbursement Eligibility Calculation.

Segment	Total Existing Length (ft)	Existing Length in Easement (ft)	Eligibility Ratio	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
2	445	380	85.39%	$195,526.98	$195,526.98	$166,966.86	$28,560.12
3	1,771	1,654	93.39%	$778,153.42	$778,153.42	$726,745.20	$51,408.22
Total	**2,216**	**2,034**	—	**$973,680.40**	**$973,680.40**	**$893,712.06**	**$79,968.34**

Comparison of Methodologies

Table 6 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 6. Case 1—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It ignores differences in reimbursement eligibility for each segment. In this case, the impact was low because the eligibility ratios were similar (85.39% and 93.39%). It ignores actual variations in cost per segment that might occur during construction.
Separate calculations and reimbursement eligibility for each segment	It considers and manages variations in reimbursement eligibility explicitly. For this utility agreement, the benefit was low because the eligibility ratios were similar (85.39% and 93.39%). For payments, managing each segment separately would enable a more accurate calculation of actual costs.	It involves more calculations by requiring separate quantities (e.g., materials, labor, etc.) for each segment. In this case, the impact was low because the analysis only included two segments. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 2—AMARILLO DISTRICT: SL 335 CONSTRUCTION PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 2635-03-018
ROW CSJ: 2635-03-019

The project involves constructing frontage roads and grade separation on SL 335 at Coulter Street South, from FM 2590 to IH 27, in Amarillo. The letting date was July 1, 2017. The low bid was $21,169,039.07. The project included ROW acquisition as well as relocation of water, electric, and gas utility facilities.

NuStar had a 6.6-inch gas pipeline crossing that interfered with the project at Coulter Street South. The existing pipeline crossed SL 335 at the intersection at approximately 45 degrees. The resolution strategy included boring under SL 335 at a depth of approximately 50 ft under the highway (Figure 3). The total length of pipeline installation was 1,300 ft.

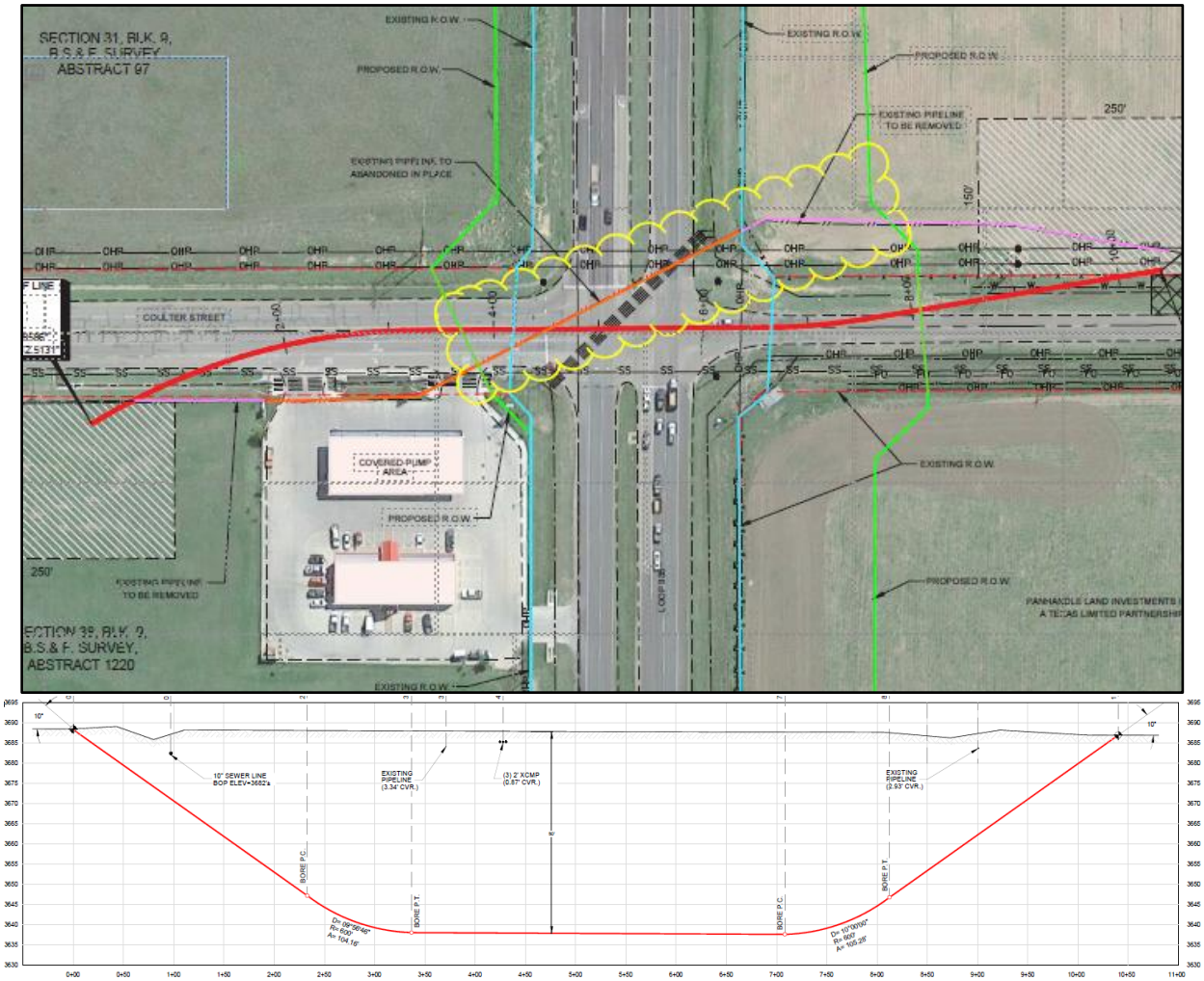


Figure 3. Case 2—Utility Relocation Plan and Profile.

The utility agreement did not clearly state the need for boring at 50 ft deep. More than likely, the need to construct a grade separation at that location and the corresponding depth requirements for the column foundations drove that need. The plans did include the boring deflection angle and other parameters needed to understand the length of the relocation outside the proposed ROW. In addition, the agreement package included plan and profile views for two similar alternative alignments that were considerably shallower (5 ft under the highway and 3 ft elsewhere) but would have involved routing the line around the south side of the gas station and crossing SL 335 south of the intersection at 90 degrees (Figure 4). The length of the two alternative alignments would have been 1,608 ft and 1,639 ft, respectively. The agreement did not elaborate, but it is reasonable to assume these two alternatives would have been more expensive to construct than the selected alternative.

Figure 4. Case 2—Alternative Pipeline Alignments South of the Intersection.

NuStar calculated the eligibility ratio by using the length method. As Figure 5 shows, TxDOT's participation was 69.71 percent. The total utility relocation cost for the installation of 1,300 ft by boring under SL 335 was $668,989.00. The relocation did not have an elective betterment or salvage credit that could reduce the total cost (although the utility agreement did not explicitly say). The eligible cost was 0.6971 × $668,989.00 = $466,352.23. However, the utility agreement did not show this amount.

Length of the pipeline from proposed N. ROW line to proposed S. ROW line = 426'
Length in the quitclaim, not eligible = 114'+15' = 129'
Length eligible = 426' – 129' = 297'
Eligibility Ratio = 297'/426' = 69.71%

Note: The term quitclaim was not correct because the pipeline segments occupied the existing ROW by permit.

Figure 5. Case 2—Reimbursement Eligibility Calculation.

The utility agreement was fully executed on April 23, 2018. On February 4, 2021, TxDOT and NuStar Logistics executed a supplemental agreement that reduced the amount and cost of some materials in the original utility agreement. The revised cost estimate decreased to $588,480.68. The eligible cost was 0.6971 × $588,480.68 = $410,229.88.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward and involved using the length method for one crossing. The plans did not show length measurements, although a sketch included with the reimbursement eligibility ratio calculation showed distances that matched the numbers used.

Alternative Reimbursement Eligibility Calculation—Scenario 1

The research team calculated an alternative eligible cost by preparing a cost estimate of the utility relocation work for each segment (i.e., inside the existing ROW, between the existing and proposed ROW, and outside the proposed ROW) and by calculating the corresponding eligible cost. The purpose of the calculation was to evaluate the impact of significant work outside the proposed ROW on the total utility relocation cost and what utility owners might claim should be eligible for reimbursement.

The utility owner did not provide disaggregated costs inside and outside the existing ROW, which made it necessary to make the following assumptions:

- The 1,300 ft to be installed is divided into 129 ft inside the existing ROW, 297 ft between the existing ROW and the proposed ROW, and 874 ft outside the proposed ROW (to be installed in a private easement).
- All costs (i.e., materials, land rights, company labor, construction costs, contract expenses, and indirect costs) are prorated by length of pipe to be installed.
- All work outside the proposed ROW is eligible for reimbursement. This means that only the work inside the existing ROW is not eligible for reimbursement.
- The utility agreement included the replacement easement in the reimbursement eligibility calculation (i.e., in compliance with TxDOT's current policy).

A more accurate calculation of costs for each segment would involve measuring quantities (e.g., materials, labor, etc.) separately. In this case, prorating costs by length of pipe is reasonable (and the only feasible option) because all the work associated with the 1,300 ft of pipeline used the same construction method (i.e., directional drilling).

Table 7 shows a summary of the calculation. The amounts highlight the weight the work outside the ROW had on the total utility relocation cost because it was necessary to bore approximately 50 ft under SL 335 and extend the boring a significant distance on either side of the proposed ROW. The total eligible cost is $530,085.29, which is higher than what the utility agreement included ($410,229.88). The methodology used for this scenario does not comply with TxDOT's policy of only recognizing reimbursement eligibility based on the amount of existing utility infrastructure because it assumes that all the work outside the proposed ROW would be included in the reimbursement eligibility calculation. However, the utility owner might argue that all the work outside the proposed ROW is necessary to complete a utility relocation activity that TxDOT requested.

Table 7. Case 2—Alternative Reimbursement Eligibility Calculation—Scenario 1.

Option	Total Existing Length (ft)	Existing Length in Easement (ft)	Length to Be Installed (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
—	426	297	1,300	—	—	—	—
Work inside existing ROW			129	$58,395.39	$58,395.39	—	$58,395.39
Work between existing ROW and proposed ROW			297	$134,445.20	$134,445.20	$134,445.20	—
Work outside proposed ROW			874	$395,640.09	$395,640.09	$395,640.09	—
			Total	**$588,480.68**	**$588,480.68**	**$530,085.29**	**$58,395.39**

Alternative Reimbursement Eligibility Calculation—Scenario 2

This scenario is like Scenario 1, except that all the work outside the proposed ROW would be ineligible for reimbursement. Table 8 shows a summary of the calculation. The total eligible cost is $134,445.20, which is lower than what the utility agreement included ($410,229.88). However, only recognizing $134,445.20 would ignore the fact that all the work outside the proposed ROW is necessary to complete the entire utility relocation activity.

Table 8. Case 2—Alternative Reimbursement Eligibility Calculation—Scenario 2.

Option	Total Existing Length (ft)	Existing Length in Easement (ft)	Length to Be Installed (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
—	426	297	1,300	—	—	—	—
Work inside existing ROW			129	$58,395.39	$58,395.39		$58,395.39
Work between existing ROW and proposed ROW			297	$134,445.20	$134,445.20	$134,445.20	—
Work outside proposed ROW			874	$395,640.09	$395,640.09	—	$395,640.09
			Total	**$588,480.68**	**$588,480.68**	**$134,445.20**	**$454,035.48**

Comparison of Methodologies

Table 9 lists advantages and disadvantages associated with the three reimbursement eligibility calculation methodologies.

Table 9. Case 2—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It underestimates the amount of work outside the proposed ROW, which in this case was quite substantial.
Separate calculations and reimbursement eligibility for each segment, assuming the work outside the proposed ROW is *eligible* for reimbursement	It considers and manages variations in reimbursement eligibility explicitly. It explicitly considers the impact of the amount of utility relocation work outside the proposed ROW on costs.	It is inconsistent with current TxDOT policy of not recognizing utility relocation work outside the proposed ROW for reimbursement eligibility calculations. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.
Separate calculations and reimbursement eligibility for each segment, assuming any work outside the proposed ROW is *ineligible* for reimbursement	None.	It ignores that work outside the proposed ROW is necessary to complete the entire utility relocation activity. The methodology is not feasible.

CASE 3—ATLANTA DISTRICT: SL 255 CONSTRUCTION PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 3403-01-001
ROW CSJ: 3403-01-002

The project involved the construction of a new 2-lane roadway (SL 255) from FM 1520 to US 271. A county road (CR 2116) already existed for about a mile between CR 2110 and US 271. The letting date was January 1, 2021. The low bid was $5,634,658.36. The project included the acquisition of ROW and several utility relocations, including electric, communications, and water.

Upshur Rural Electric Cooperative (UREC) had aboveground distribution lines that interfered with the new project alignment, either because the vertical clearance of the lines was insufficient or the poles were inside the proposed ROW and affected project features (Figure 6). Most poles were in the vicinity of existing county roads intersecting the new highway.

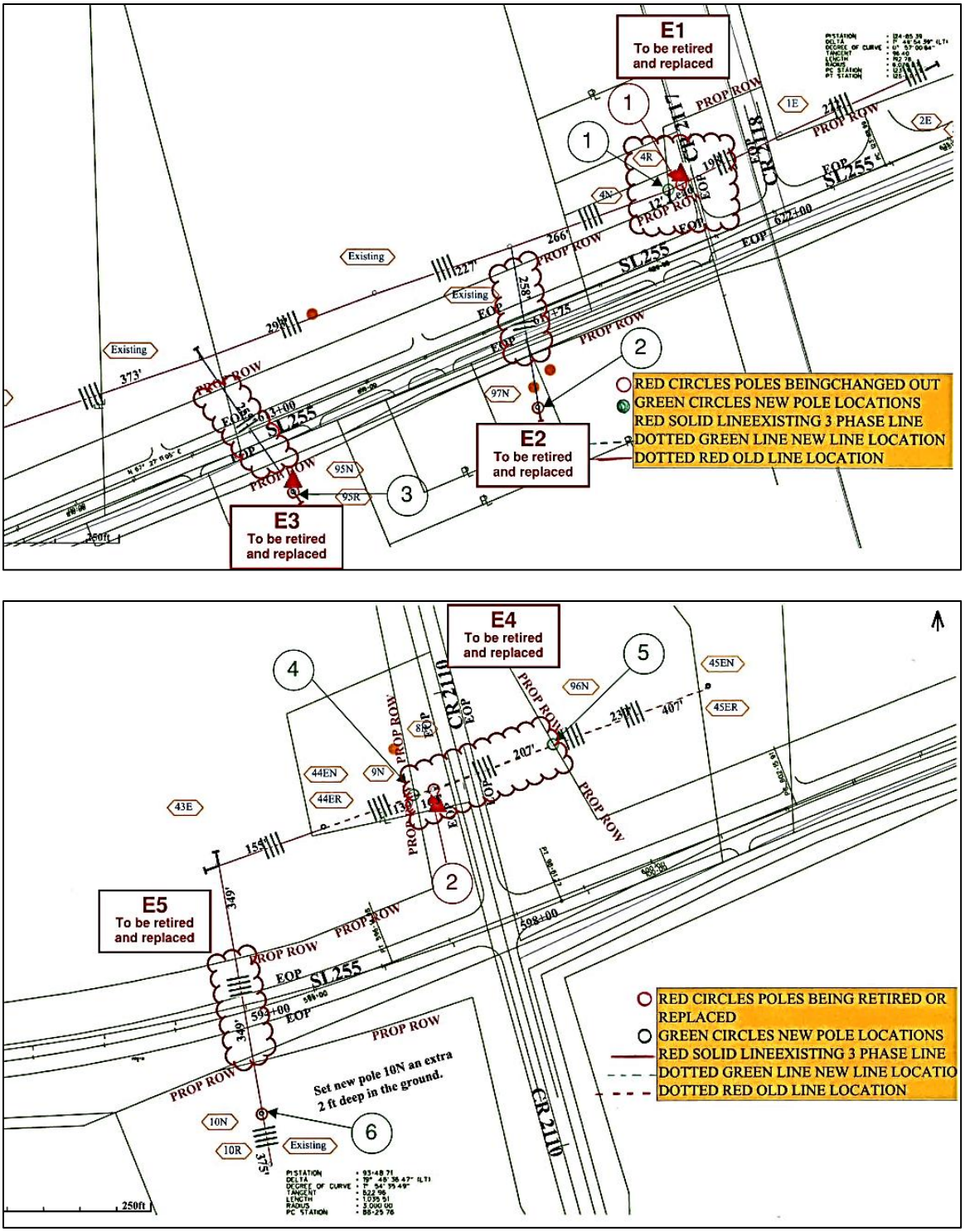


Figure 6. Case 3—Utility Relocation Plan.

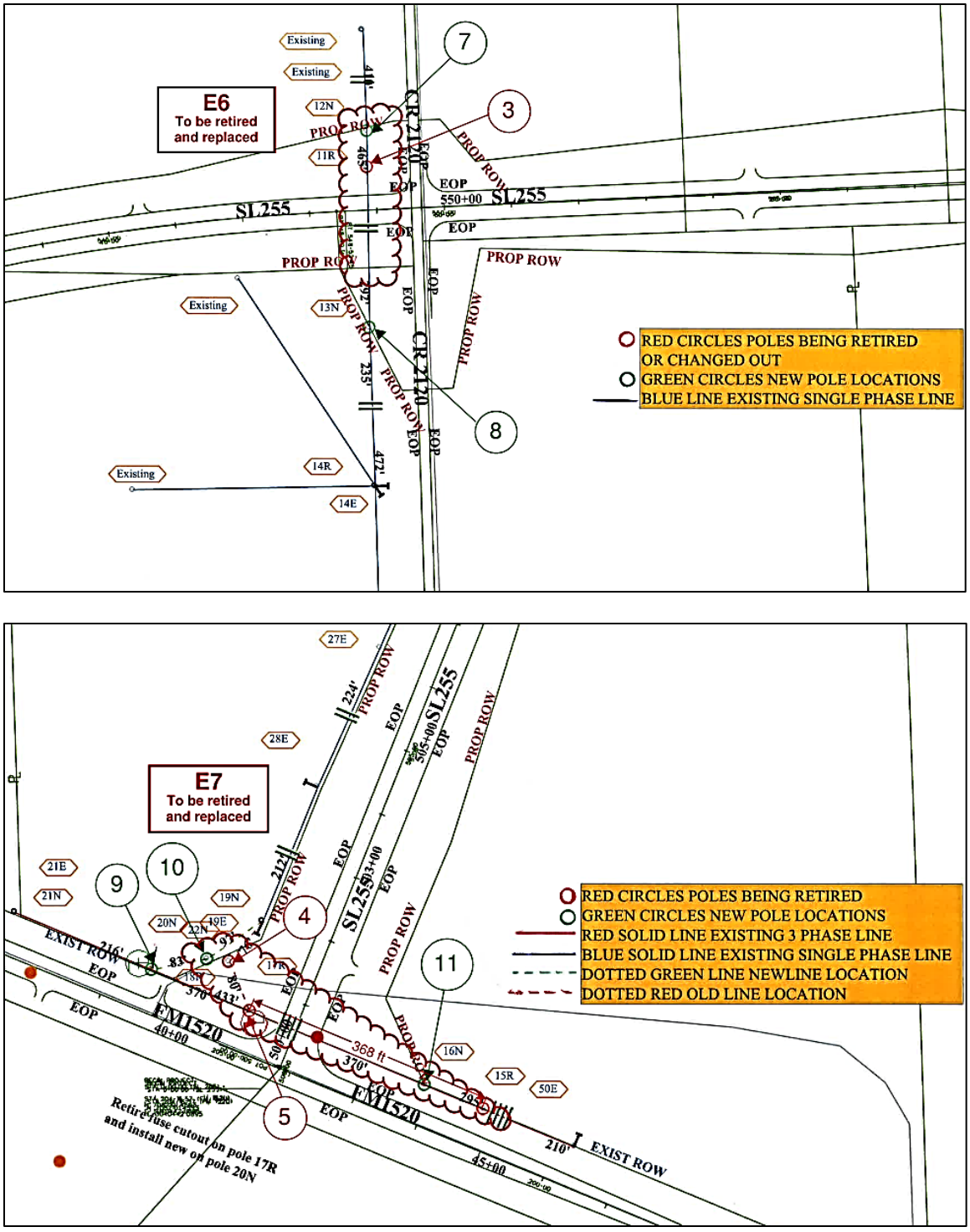


Figure 6. Case 3—Utility Relocation Plan (continued).

The selected resolution involved removing existing poles and lines and installing new lines on taller poles outside the proposed ROW, as follows:

- Location E1: Remove a 55-ft Class 3 pole and install a 55-ft Class 3 pole.
- Location E2: Remove a 35-ft Class 5 pole and install a 45-ft Class 4 pole.

- Location E3: Remove a 35-ft Class 5 pole and install a 50-ft Class 4 pole.
- Location E4: Remove a 40-ft Class 3 pole and install a 40-ft Class 5 pole and a 40-ft Class 4 pole.
- Location E5: Remove a 40-ft Class 5 pole and install a 55-ft Class 1 pole.
- Location E6: Remove a 35-ft Class 6 pole and install a 40-ft Class 4 pole and a 45-ft Class 4 pole.
- Location E7: Remove 3 40-ft Class 4 poles and install a 40-ft Class 4 pole, a 50-ft Class 1 pole, and a 50-ft Class 2 pole.

UREC calculated an eligibility ratio using the pole count method. As Figure 7 shows, 4 of the 5 existing poles were in a private easement, resulting in a TxDOT participation of 80.00 percent. The total estimated utility relocation cost was $45,621.02. The standard utility agreement included a detailed tabulation of the cost of materials, labor, and other categories for the entire utility relocation, but not at the single pole level. The relocation included a forced betterment because of the need to use taller poles. None of the relocations had elective betterments or salvage credit that could reduce the total cost. The eligible cost was 0.8000 × $45,621.02 = $36,496.82.

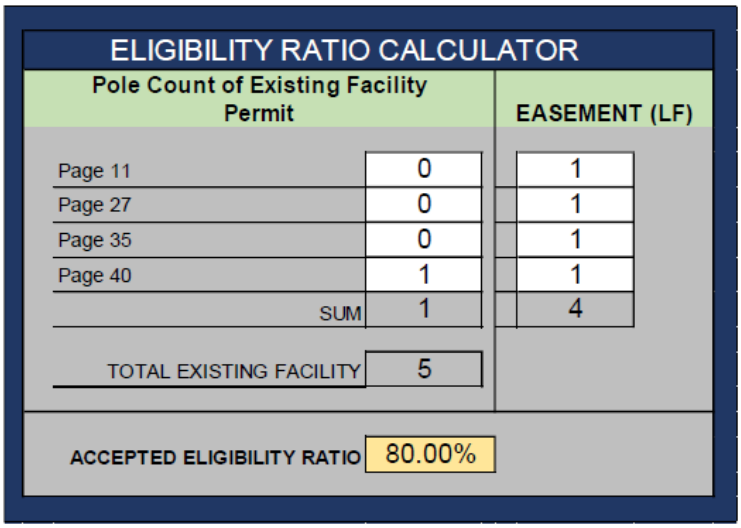


Figure 7. Case 3—Reimbursement Eligibility Calculation.

The standard utility agreement was fully executed on November 6, 2020. At that time, UREC estimated a start date of November 11, 2020 and an end date of December 10, 2020. On July 7, 2021 (and revised on August 19, 2021), TxDOT and UREC executed a supplemental agreement to correct cost calculations. As a result, the total estimated utility relocation cost decreased to $32,773.66. The revised eligible cost was 0.8000 × $32,773.66 = $26,218.93.

Pole Method Improvement

It was difficult to understand the reimbursement eligibility calculation for this utility agreement. The plans included an identification number and color coding to differentiate

which poles were retired or proposed. At FM 1520, the utility agreement acknowledged that three existing poles were removed and replaced by new poles, but the plans showed existing poles directly on top of the existing ROW line, which made it impossible to confirm whether the existing poles were located inside the existing ROW or in private easement. Two of the three poles must have been located inside the existing ROW because they were excluded from the reimbursement eligibility calculation. Having the existing ROW, the proposed ROW, existing facilities, and proposed facilities clearly marked on the plans would have facilitated the review.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by considering each location separately based on the reimbursement eligibility associated with the corresponding poles. Locations E1 through E6 were 100 percent reimbursable. E7 was partially reimbursable. The cost estimate in the utility agreement disaggregated the cost of materials, but construction, labor, and other costs were aggregated for the entire utility relocation. This situation made it necessary to make assumptions to allocate costs per location. In the case of Location E7, because of the lack of clarity with respect to where the existing pole was, the research team made assumptions with respect to the length of the line inside the existing ROW. The research team measured 350 ft inside the existing ROW and 80 ft in existing private easement up to the proposed ROW, for a total of 430 ft. Based on this assumption, the reimbursement eligibility was 18.60 percent.

Table 10 summarizes the reimbursement eligibility calculation for each location. These cost estimates would provide the basis for reimbursement. The total eligible cost was $24,447.60, which was lower than the eligible cost included in the supplemental agreement. However, this is a coincidence given the assumptions described above. If the utility owner had provided disaggregated costs for each location, the total eligible cost would have been different.

Table 10. Case 3—Alternative Reimbursement Eligibility Calculation.

Location	Reimbursement Eligibility	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
E1	100%	$4,581.14	$4,581.14	$4,581.14	—
E2	100%	$2,131.06	$2,131.06	$2,131.06	—
E3	100%	$3,897.86	$3,897.86	$3,897.86	—
E4	100%	$4,706.75	$4,706.75	$4,706.75	—
E5	100%	$4,581.14	$4,581.14	$4,581.14	—
E6	100%	$2,646.54	$2,646.54	$2,646.54	—
E7	18.60%	$10,229.16	$10,229.16	$1,903.10	$8,326.06
Total	—	**$32,773.66**	**$32,773.66**	**$24,447.60**	**$8,326.06**

Comparison of Methodologies

Table 11 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 11. Case 3—Methodology Comparison.

Methodology	Advantages	Disadvantages
Pole method	In theory, it is easy to understand and apply. However, the advantage did not materialize because the plans were difficult to read and interpret.	It is problematic in situations in which the plans do not show where poles are in relation to the existing or proposed ROW. It is sensitive to the number of poles. As the number of poles decreases, the risk of overestimating or underestimating reimbursement eligibility levels increases. In this case, with 5 poles in the calculation, misclassifying 1 pole would cause the eligibility ratio to change by 20%.
Separate calculations and reimbursement eligibility for each location	It shows the actual influence of each location by identifying which locations account for most of the reimbursable cost. It facilitates a clearer understanding of actual cost distribution by location, which can help during review or auditing.	It involves more calculations by requiring separate quantities (e.g., materials, labor, etc.) for each location. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 4—ATLANTA DISTRICT: US 59 INTERCHANGE IMPROVEMENT PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0063-10-015
ROW CSJ: 0063-10-018

The project involved constructing a grade separation to interstate standards (future IH 369) at FM 1794. The letting date was June 1, 2023. The low bid was $36,905,848.43. The project included the acquisition of ROW and several utility relocations, including electric, communications, gas, and water.

Hawk Gathering Company had a 6-inch pipeline that interfered with the proposed elevated changes on US 59. The proposed ditch dissected the current location of the pipeline on the east side of the highway (Figure 8). The selected resolution involved abandoning the pipeline in place by cutting, capping, and filling it with flowable fill. The resolution also involved moving equipment that facilitated the pipeline cleaning process from the inactive side of the abandoned section to the active side and making changes to the remaining active portion of the line to operate as designed, including offsetting the centerline of the

pipeline to allow for the width of the pig launcher. The plans did not show it clearly, but two pipelines crossed the highway, and the relocation involved abandoning one of the pipelines in place.

Hawk Gathering calculated an eligibility ratio using the length method. As Figure 9 shows, TxDOT's participation was 49.23 percent. The total estimated utility relocation cost was $63,204.87. None of the relocations had elective betterments or salvage credit that could reduce the total cost. The eligible cost was 0.4923 × $63,204.87 = $31,115.76. The standard utility agreement was fully executed on July 29, 2022. At that time, Hawk Gathering estimated a start date of August 1, 2022 and an end date of September 29, 2022.

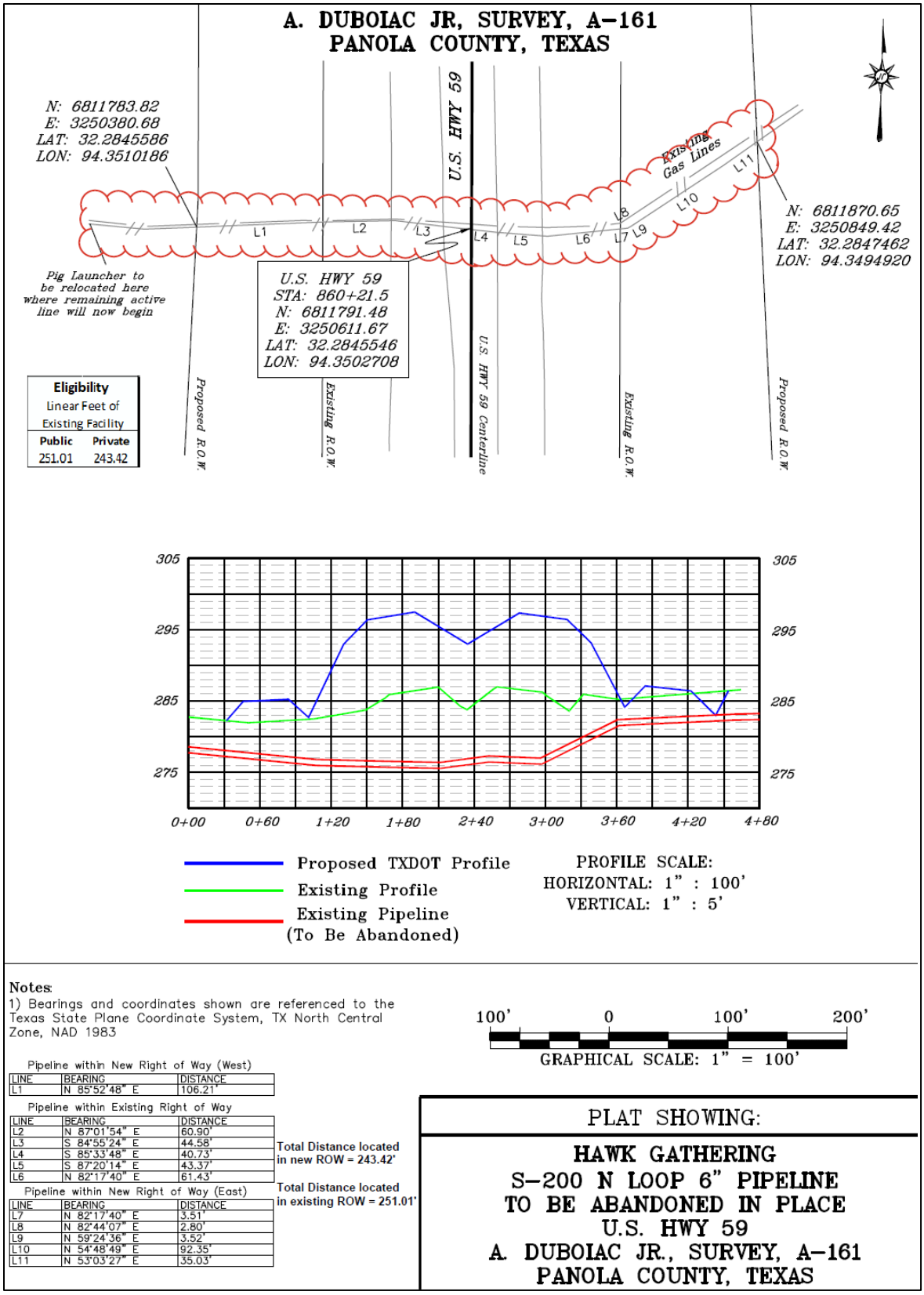


Figure 8. Case 4—Utility Relocation Plan.

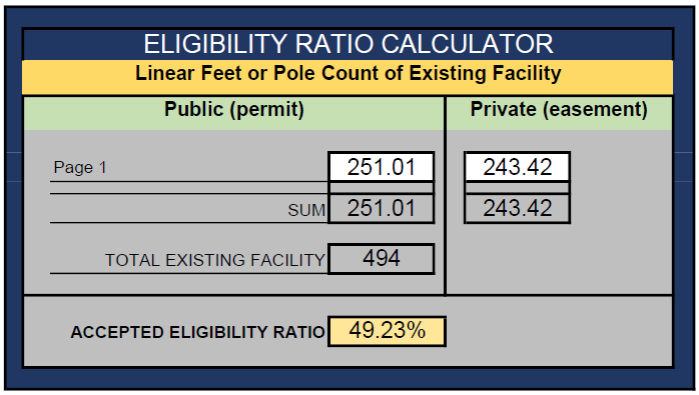


Figure 9. Case 4—Reimbursement Eligibility Calculation.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. It involved measuring the length of the existing pipeline inside the existing ROW and measuring the length of the existing pipeline between the existing ROW and the proposed ROW. The work included relocating the pig launcher outside the proposed ROW, but the plans did not show the extent of that work (Figure 8). The plans also did not show the original location of the pig launcher. However, based on information included in the easement document, the pig launcher was located just outside the existing ROW.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by examining each of the components of the relocation both inside and outside the existing ROW and by estimating the corresponding costs. The cost estimate in the utility agreement did not disaggregate these costs, which made it necessary to make cost allocation assumptions for each cost category (i.e., materials, labor, and office and overhead) by prorating the corresponding costs by length. In this case, the length of pipe to be installed matched the length of the existing pipe. The cost of the pig launcher relocation was assigned to the utility relocation cost outside the existing ROW.

As Table 12 shows, the eligible cost would be $56,990.70. This estimate was significantly higher than the eligible cost obtained using the normal length method (i.e., $31,115.76) because it was possible to allocate costs between costs inside the existing ROW and costs outside the existing ROW. A significant factor was the cost to relocate the existing pig launcher, all of which was outside the existing ROW.

Table 12. Case 4—Alternative Reimbursement Eligibility Calculation.

Option	Total Existing Length (ft)	Existing Length in Easement (ft)	Length to Be Installed (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
—	251.01	243.00	494.00	—	—	—	—
Work inside existing ROW			251.01	$6,214.17	—	—	$6,214.17
Work between existing ROW and proposed ROW			243.00	$56,990.70	—	$56,990.70	—
			Total	**$63,204.87**	**$63,204.87**	**$56,990.70**	**$6,214.17**

Comparison of Methodologies

Table 13 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 13. Case 4—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It relies on clear plans to identify all installation component location details. In this case, the plans did not show the original or relocated position of the launcher, which was a key factor in ensuring the pipeline was functional again after the relocation.
Separate calculations and reimbursement eligibility for each location	It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing. It enables greater accuracy in distinguishing reimbursable and non-reimbursable work.	Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 5—ATLANTA DISTRICT: US 59 INTERCHANGE IMPROVEMENT PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0063-10-015
ROW CSJ: 0063-10-018

The project involved constructing a grade separation to interstate standards (future IH 369) at FM 1794. The letting date was June 1, 2023. The low bid was $36,905,848.43. The project included the acquisition of ROW and several utility relocations, including electric, communications, gas, and water.

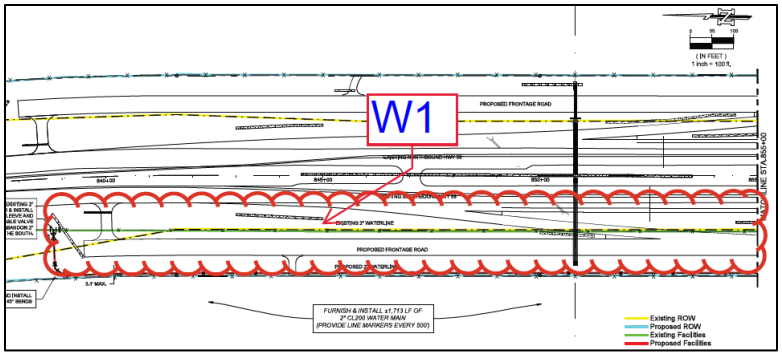
The Rock Hill Water Supply Corporation (RHWSC) had 2-inch, 5-inch, and 6-inch water mains totaling 9,053 ft running just outside the existing ROW along the west side of US 59 near FM 1794. These lines interfered with the proposed frontage roads and overall widening of US 59 (Figure 10). The selected resolution involved relocating the water mains to new locations just inside the proposed ROW line.

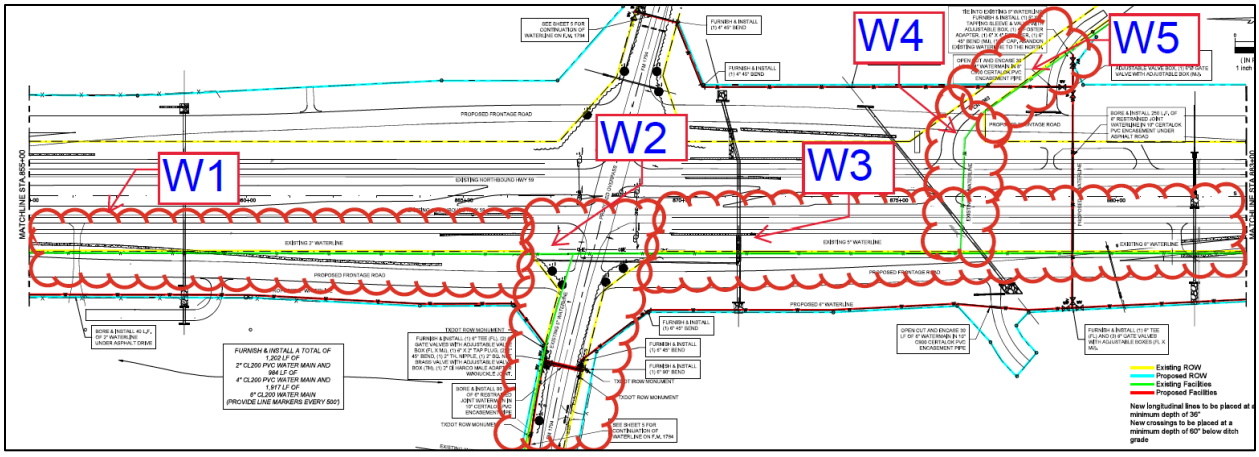
RHWSC calculated an eligibility ratio using the length method. As Figure 11 shows, TxDOT's participation was 66.51 percent. For the calculation, RHWSC measured lengths of existing pipelines on each of the three sheets included in the utility agreement. (The research team added Segments W1, W2, and so on to the figure to understand the scope of the utility relocation. This visual depiction was not part of the utility agreement package.)

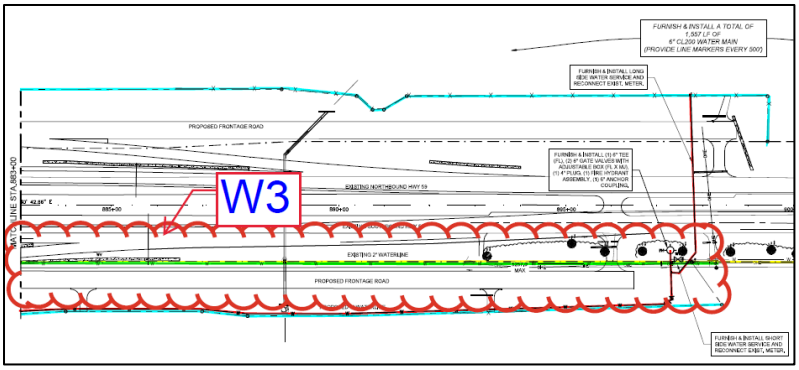
The total estimated utility relocation cost was $378,442.30. None of the relocations had elective betterments or salvage credit that could reduce the total cost. The eligible cost was 0.6651 × $378,442.30 = $251,701.97. The standard utility agreement was fully executed on February 6, 2020. At that time, RHWSC estimated a start date of April 12, 2023 and an end date of June 30, 2023.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was confusing. The plans showed total pipeline lengths per sheet (both inside and outside the existing ROW) but did not clearly show the location and extent of the various pipeline segments. Clearly showing this information on the plans would have made the review of the reimbursement eligibility calculation easier to conduct.







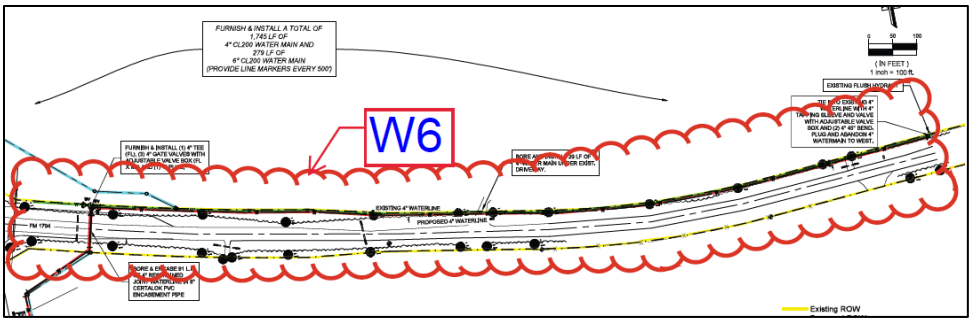


Figure 10. Case 5—Utility Relocation Plan.

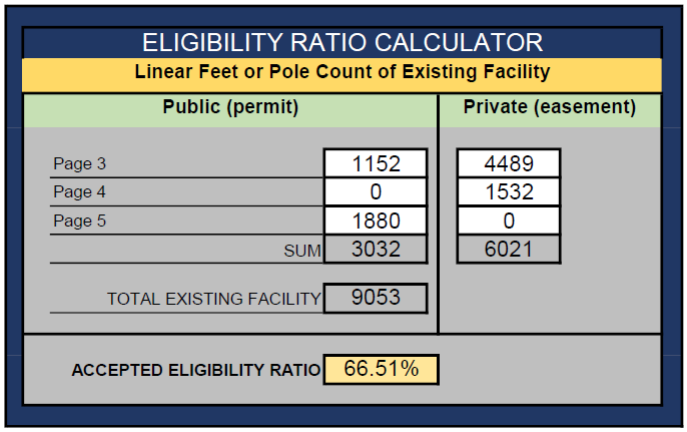


Figure 11. Case 5—Reimbursement Eligibility Calculation.

Alternative Reimbursement Eligibility Calculation—Scenario 1

The research team calculated an alternative eligible cost by dividing the entire relocation into six segments and by preparing an estimate of the utility relocation work for each of those segments (Figure 10). The plans did not clearly show the length and extent of the various pipeline segments, but from the stations it was possible to measure approximate lengths.

The main criterion for identifying each segment was whether the pipeline segment involved was inside or outside the existing ROW. This strategy would make the corresponding utility relocation cost fully reimbursable or not reimbursable at all. Table 14 summarizes the reimbursement eligibility calculation. The amounts shown would provide the basis for reimbursement. In total, $243,673.72 would be eligible for reimbursement. This estimate was lower than the amount associated with the length method used in the utility agreement (i.e., $251,701.97). However, this is just a coincidence given the assumptions made for the analysis.

Table 14. Case 5—Alternative Reimbursement Eligibility Calculation—Scenario 1.

Segment	Reimbursement Eligibility	Length (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
W1	100%	1,200	$72,684.18	$72,684.18	$72,684.18	—
W2	0%	80	$4,845.61	$4,845.61	—	$4,845.61
W3	100%	2,473	$149,789.98	$149,789.98	$149,789.98	—
W4	0%	400	$24,228.06	$24,228.06	—	$24,228.06
W5	100%	350	$21,199.55	$21,199.55	$21,199.55	—
W6	0%	1,745	$105,694.91	$105,694.91	—	$105,694.91
Total	—	6,248	**$378,442.30**	**$378,442.30**	**$243,673.72**	**$134,768.58**

Alternative Reimbursement Eligibility Calculation—Scenario 2

This scenario is like Scenario 1, except that segments are combined to reflect "logical" utility relocation stages or phases. Segments W4 and W5 are part of the same crossing. W4 is inside the existing ROW and W5 is outside the existing ROW. Combining W4 and W5 into one segment would enable a calculation of the reimbursable cost by using the length method. Segments W1, W2, and W3 could be combined, but W2 is both much shorter than W1and W3 and ineligible for reimbursement, therefore it was not included in the combined work. W6 is a different segment associated with a different utility relocation phase and was also not reimbursable.

Table 15 summarizes the reimbursement eligibility calculation. The total eligible cost was $222,474.16 for the combined W1 and W3 segment and $21,199.55 for the combined W4 and W5 segment. For Segments W2 and W6, it was zero. These amounts would provide the basis for reimbursement. The total eligible cost was $243,673.72, which was the same as for Scenario 1, except that it would provide a more consolidated way to evaluate reimbursement eligibility.

Table 15. Case 5—Alternative Reimbursement Eligibility Calculation—Scenario 2.

Segment	Reimbursement Eligibility	Length (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
W1/W3	100%	3,673	$222,474.16	$222,474.16	$222,474.16	—
W2	0%	80	$4,845.61	$4,845.61	—	$4,845.61
W4/W5	46.67%	750	$45,427.61	$45,427.61	$21,199.55	$24,228.06
W6	0%	1,745	$105,694.91	$105,694.91	—	$105,694.91
Total	—	6,248	**$378,442.30**	**$378,442.30**	**$243,673.72**	**$134,768.58**

Comparison of Methodologies

Table 16 lists advantages and disadvantages associated with the three reimbursement eligibility calculation methodologies.

Table 16. Case 5—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It relies on clear plans to identify all installation component location details. In this case, the plans did not clearly show the length and extent of the various pipeline segments.
Separates calculations and reimbursement eligibility for each segment by classifying segments depending on their location with respect to the existing ROW	It facilitates more transparent reimbursement by clearly identifying which segments are eligible for reimbursement.	It requires detailed quantities and costs at the segment level, which were not available in this case. Dividing segments by reimbursement eligibility overlooks differences in the field with respect to construction methods or phasing, making the separation of cost components more difficult. Grouping segments by construction method or phasing would be more appropriate and efficient. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.
Separates calculations and reimbursement eligibility for each segment by grouping segments into logical utility relocation stages or phases	It ensures that reimbursement is based on realistic construction sequencing, aligning the calculation with how the work would be performed. It facilitates more transparent reimbursement by clearly identifying which segments are eligible for reimbursement.	It requires construction experience to identify logical relocation phases. If segments are not combined appropriately, the calculation may become inaccurate. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 6—BEAUMONT DISTRICT: US 69 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0200-09-069
ROW CSJ: 0200-09-075

The project involves widening US 69 to a 4-lane divided highway from the Tyler County line to 0.75 mi south of FM 1003. The letting date was September 6, 2023. The low bid was $87,089,175.51. The project included the acquisition of ROW and several utility relocations, including communications and gas.

Houston Pipe Line Company (HPLC) had 1 12-inch gas pipeline crossing that interfered with the project. The existing pipeline did not meet minimum vertical clearance requirements between the pipe and the proposed highway grade and the bottom of the ditches (Figure 12). The selected resolution strategy was to abandon the segment under the existing ROW, remove the segment of the existing pipe between the existing ROW line and the proposed ROW line, and install 288 ft of 12-inch steel pipe via directional boring. The depth of cover of the new pipeline was at least 8.15 ft (under one of the proposed ditches). The new line kept the same crossing angle with respect to the highway (64 degrees) as the existing line. It was not clear why the relocation did not include a variance.

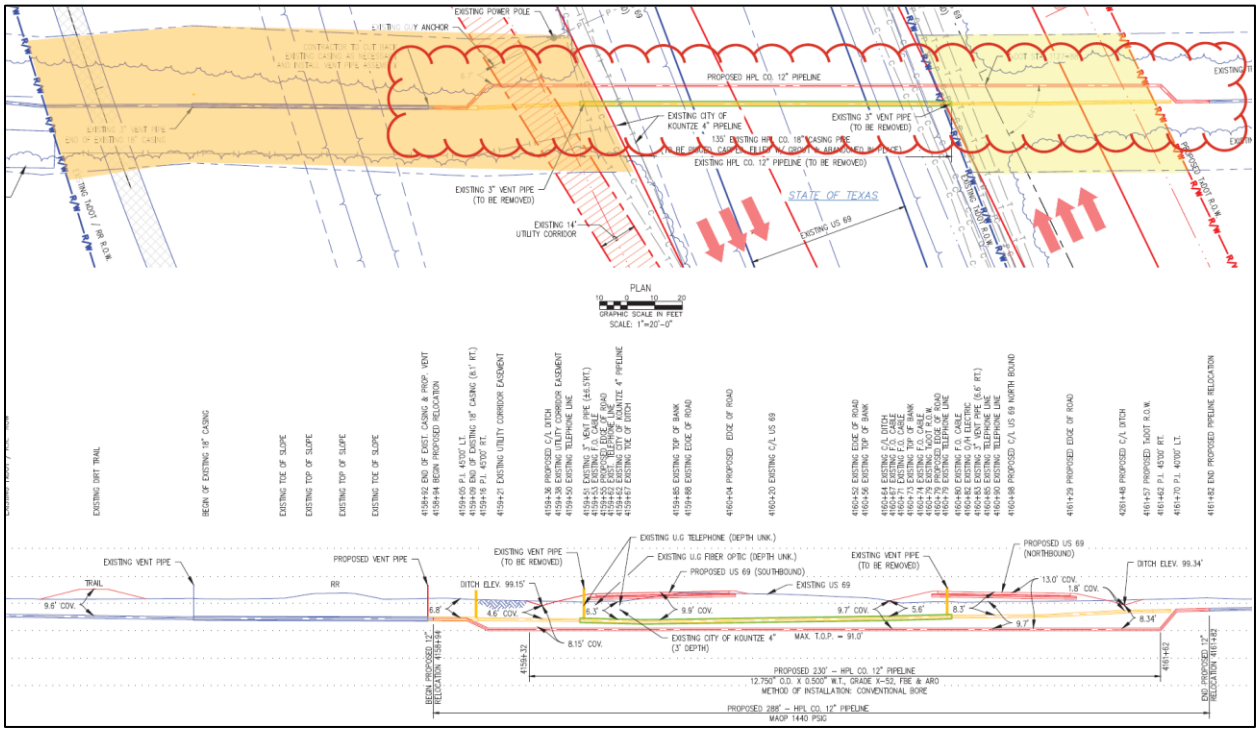


Figure 12. Case 6—Utility Relocation Plan and Profile.

HPLC calculated the eligibility ratio by using the length method. As Figure 13 shows, TxDOT's participation was 68.32 percent. The eligibility calculation included the length of pipe inside the proposed ROW, but not any length outside the proposed ROW. The total estimated utility relocation cost was $924,511.41. This amount included the work needed to make the pipeline functional again, involving the installation of the pipeline outside the proposed ROW up to the tie-in points. The resolution did not have elective betterments or salvage credit that could reduce the total cost. As a result, the eligible cost was 0.6832 × $924,511.41 = $631,626.20. The standard utility agreement was fully executed on April 19, 2023. At that time, HPLC estimated a start date of July 10, 2023 and an end date of August 10, 2023.

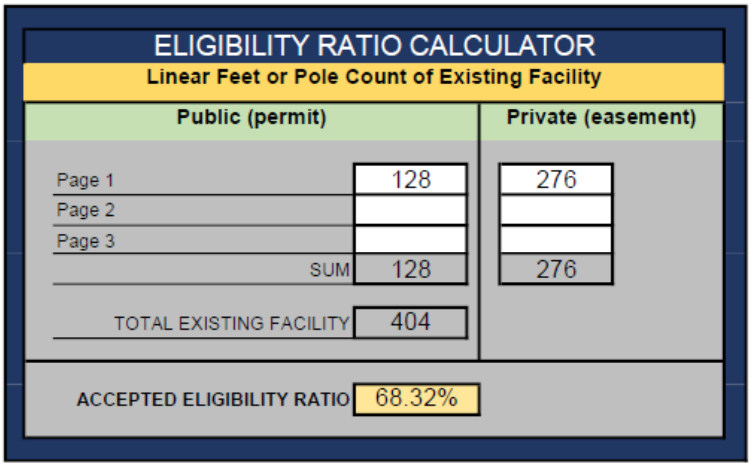


Figure 13. Case 6—Reimbursement Eligibility Calculation.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. It involved measuring the length of the pipe inside the existing ROW (i.e., 128 ft) and the length of the pipe in existing private easement up to the proposed ROW line (i.e., 276 ft), for a total of 404 ft. However, as Figure 12 shows, the scope of work as shown on the plans suggests affected lengths were different. The relocation did not affect almost two thirds of the pipeline in the existing private easement. The total length of the pipe affected by the relocation was approximately 288 ft, of which approximately 27 ft were outside the proposed ROW. Under these conditions, the eligibility ratio should have been (261 – 128) ÷ 261 = 50.96%. The eligible cost would have been $471,131.01.

Alternative Reimbursement Eligibility Calculation—Scenario 1

The research team calculated an alternative eligible cost by preparing a cost estimate of the utility relocation work for each segment (i.e., inside the existing ROW, between the existing and proposed ROW, and outside the proposed ROW) and by calculating the corresponding eligible cost. The purpose of the calculation was to evaluate the impact of the work outside the proposed ROW on the total utility relocation cost and what utility owners might claim should be eligible for reimbursement.

The cost estimate included in the utility agreement disaggregated the cost of materials by individual material and quantity used. Other cost categories (i.e., contractor, labor, and support) were aggregated for the entire 288-ft relocation effort. All the pipe segments were similar in terms of scope of work, which enabled the research team to make the following assumptions:

- The 288 ft to be installed is divided into 128 ft inside the existing ROW, 133 ft between the existing ROW and the proposed ROW, and 27 ft outside the proposed ROW.

- All costs (i.e., materials, land rights, company labor, construction costs, contract expenses, and indirect costs) are prorated by length of pipe to be installed.
- All work outside the proposed ROW is eligible for reimbursement. This means that only the work inside the existing ROW is not eligible for reimbursement.

A more accurate calculation of costs for each segment would involve measuring quantities (e.g., materials, labor, etc.) separately. In this case, prorating costs by length of pipe is reasonable (and the only feasible option) because all the work associated with the 288 ft of pipeline used the same construction method (i.e., directional drilling).

Table 17 shows a summary of the calculation. The total eligible cost is $513,617.45, which is higher than the eligible cost mentioned above (i.e., $471,131.01). The methodology used for this scenario does not comply with TxDOT's policy of only recognizing reimbursement eligibility based on the amount of existing utility infrastructure because it assumes that all the work outside the proposed ROW would be included in the reimbursement eligibility calculation. However, the utility owner might argue that all the work outside the proposed ROW is necessary to complete a utility relocation activity that TxDOT requested.

Table 17. Case 6—Alternative Reimbursement Eligibility Calculation—Scenario 1.

Option	Total Existing Length (ft)	Existing Length in Easement (ft)	Length to Be Installed (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
—	288	160	288	—	—	—	—
Work inside existing ROW			128	$410,893.96	$410,893.96		$410,893.96
Work between existing ROW and proposed ROW			133	$426,944.51	$426,944.51	$426,944.51	—
Work outside proposed ROW			27	$86,672.94	$86,672.94	$86,672.94	—
			Total	**$924,511.41**	**$924,511.41**	**$513,617.45**	**$410,893.96**

Alternative Reimbursement Eligibility Calculation—Scenario 2

This scenario is like Scenario 1, except that all the work outside the proposed ROW would be ineligible for reimbursement. Table 18 shows a summary of the calculation. The total eligible cost is $426,944.51, which is lower than the eligible cost mentioned above (i.e., $471,131.01). It is also lower than the eligible cost under Scenario 1.

Table 18. Case 6—Alternative Reimbursement Eligibility Calculation—Scenario 2.

Option	Total Existing Length (ft)	Existing Length in Easement (ft)	Length to Be Installed (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
—	288	160	288	—	—	—	—
Work inside existing ROW			128	$410,893.96	$410,893.96	—	$410,893.96
Work between existing ROW and proposed ROW			133	$426,944.51	$426,944.51	$426,944.51	—
Work outside proposed ROW			27	$86,672.94	$86,672.94	—	$86,672.94
			Total	**$924,511.41**	**$924,511.41**	**$426,944.51**	**$497,566.90**

Comparison of Methodologies

Table 19 lists advantages and disadvantages associated with the three reimbursement eligibility calculation methodologies.

Table 19. Case 6—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It underestimates the amount of work outside the proposed ROW, which in this case was minor. Inaccurate results may occur when plans are not clear or detailed, as in this case.
Separate calculations and reimbursement eligibility for each segment, assuming the work outside the proposed ROW is *eligible* for reimbursement	It facilitates more transparent reimbursement by clearly identifying which segments are eligible for reimbursement.	Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.
Separate calculations and reimbursement eligibility for each segment, assuming any work outside the proposed ROW is *ineligible* for reimbursement	None.	It ignores the fact that work outside the proposed ROW is necessary to complete the entire utility relocation activity. The methodology is not feasible.

CASE 7—BRYAN DISTRICT: SH 21 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0117-03-024
ROW CSJ: 0117-03-034

The project involves widening SH 21 to a 4-lane divided highway between the Brazos County line and 1 mi east of FM 39. The letting date was November 6, 2024. The low bid was $35,279,004.80. The project includes the acquisition of ROW and several utility relocations, including electric, communications, gas, and water.

ETC Texas Pipeline had four pipeline crossings that interfered with the proposed pavement grade and drainage structures. The existing pipelines did not meet vertical clearance requirements. As Figure 14 shows, the utility owner grouped the four crossings into three crossing locations. For 2 crossings that involved an 8-inch pipeline and a 4-inch pipeline, the selected resolution involved removing the existing pipelines and installing new pipelines using a directional drilling method. The pits for the directional boring were located just outside the proposed ROW. For the 6-inch and 3-inch pipeline crossings, the selected resolution included abandoning parts of the existing pipelines, relocating a section of the 6-inch pipeline, extending the 10-inch casing to protect the 6-inch pipeline that remained in place, and relocating the 3-inch pipeline. The new pipeline installation used an open trench method.

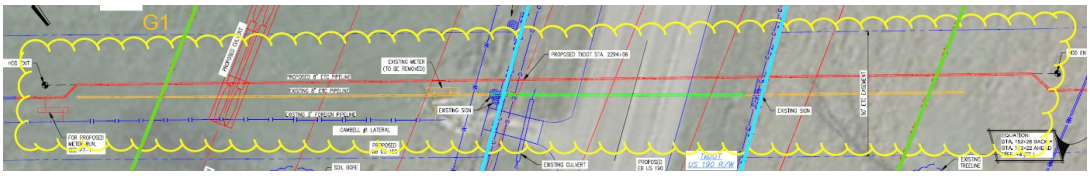
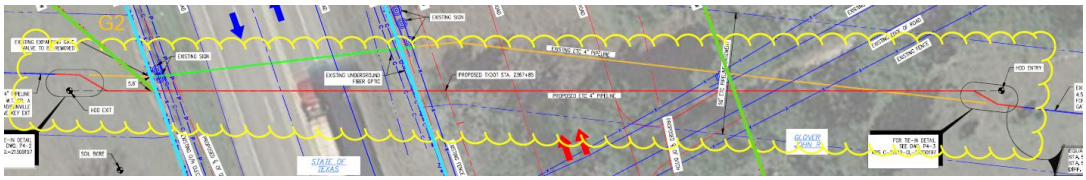
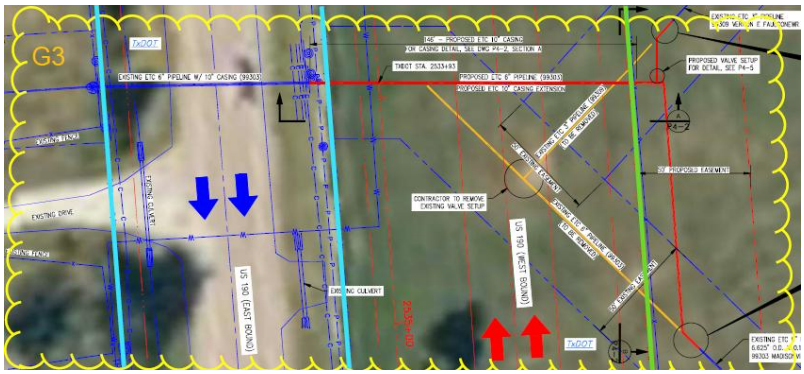
Crossing 1	
Crossing 2	
Crossings 3 and 4	

Figure 14. Case 7—Utility Relocation Plan.

ETC Texas Pipeline used a CER method based on separate calculations for each of the three crossing locations. As Table 20 shows, the utility owner first calculated an eligibility ratio based on length for each crossing location. (The utility agreement had an error in the summation of the pipeline lengths in the private easement. The total should be 263 ft, not 245 ft. This error was also noted by staff who reviewed the standard utility agreement after it was submitted to the Right of Way Division.) The lengths mentioned above were measured along the existing pipelines.

Table 20. Case 7—Reimbursement Eligibility Calculation.

Crossing	Description	Length in Existing Public ROW (ft)	Length in Existing Easement (ft)	Total Existing Length (ft)	Eligibility Ratio	Utility Relocation Cost	Eligible Cost
1	8-inch gas line	108	241	349	69.05%	$995,097.47	$687,159.00
2	4-inch gas line	104	141	245	57.55%	$837,344.94	$481,900.56
3 and 4	6-inch and 3-inch gas lines	0	263	263	100.00%	$807,252.47	$807,252.47
	Total	**212**	**645**	**857**	—	**$2,639,694.88**	**$1,976,312.03**
						Composite Eligibility Ratio	**74.87%**

Next, the utility owner calculated the eligible cost for each crossing location, added the eligible costs, and calculated a CER as the ratio between the total eligible cost (i.e., $1,976,312.03) and the total utility relocation cost (i.e., $2,639,694.88). TxDOT's participation was 74.87 percent. (According to TxDOTCONNECT, the eligible cost was 0.7487 × $2,639,694.88 = $1,976,339.56. The utility agreement did not mention this amount, but it did show that the basis for the eligibility ratio calculation was $2,639,694.88). The standard utility agreement included a detailed tabulation of the cost of materials and labor for each crossing location. Engineering and other construction support costs were calculated for the entire utility relocation. The estimate also included $157,185.00 for replacement easement costs.

The total utility relocation cost of $2,639,694.88 included the work needed to make the pipelines functional again, involving the installation of the pipeline outside the proposed ROW up to the tie-in points. None of the relocations had elective betterments or salvage credit that could reduce the total cost.

The standard utility agreement was fully executed on November 7, 2023. At that time, ETC Texas Pipeline estimated a start date of February 5, 2024 and an end date of May 3, 2024.

CER Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. As mentioned, it involved calculating eligibility ratios for each crossing location, calculating the eligible cost for each crossing location, adding these costs, and dividing the result by the total utility relocation cost.

Alternative Reimbursement Eligibility Calculation

The research team attempted to calculate an alternative eligible cost by explicitly accounting for work outside the proposed ROW. The cost estimate in the utility agreement disaggregated costs for materials for individual crossing locations, but in other categories such as contractor, surveying, and inspection costs, the cost estimate was aggregated for the entire relocation. As a result, it was not possible to make reasonable assumptions regarding the distribution of contractor, surveying, and inspection costs among individual crossing locations, which also meant that it was not possible to reliably separate costs inside the proposed ROW and costs outside the proposed ROW.

In the absence of this critical information, the research team calculated eligible costs for each crossing location using the length method for each crossing. It is the same procedure as Table 20 shows, except that a CER is not calculated because each crossing is managed separately. Table 21 shows the results. These cost estimates would provide the basis for reimbursement.

Table 21. Case 7—Alternative Reimbursement Eligibility Calculation.

Crossing	Description	Length in Existing Public ROW (ft)	Length in Existing Easement (ft)	Total Existing Length (ft)	Eligibility Ratio	Utility Relocation Cost	Eligible Cost
1	8-inch gas line	108	241	349	69.05%	$995,097.47	$687,159.00
2	4-inch gas line	104	141	245	57.55%	$837,344.94	$481,900.56
3 and 4	6-inch and 3-inch gas lines	0	263	263	100.00%	$807,252.47	$807,252.47
Total		**212**	**645**	**857**	—	**$2,639,694.88**	**$1,976,312.03**

Comparison of Methodologies

Table 22 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 22. Case 7—Methodology Comparison.

Methodology	Advantages	Disadvantages
CER method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	Mixing segments with different eligibility ratios masks specific reimbursement conditions associated with individual crossings. In this case, the impact was minor because the reimbursement eligibility levels were not too dissimilar.
Separate calculations and reimbursement eligibility for each location	It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing. It shows the actual impact of each segment by identifying which segments account for most of the reimbursable cost.	It requires detailed quantities and costs for each location, which were not available in this case. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT. Currently, to account for each location separately, it would be necessary to execute separate utility agreements.

CASE 8—BRYAN DISTRICT: SH 21 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0117-03-024
ROW CSJ: 0117-03-034

The project involves widening SH 21 to a 4-lane divided highway between the Brazos County line and 1 mi east of FM 39. The letting date was November 6, 2024. The low bid was $35,279,004.80. The project includes the acquisition of ROW and several utility relocations, including electric, communications, gas, and water.

Seaway Crude Pipeline (SCP) had 2 30-inch gas pipeline crossings that interfered with the new ditches running longitudinally next to the proposed ROW lines (Figure 15). The vertical clearing between the bottom of the ditches and the two pipelines was insufficient. The selected resolution strategy involved (a) protecting the pipes in place at those locations using a concrete slab and (b) inspecting and recoating two pipe segments.

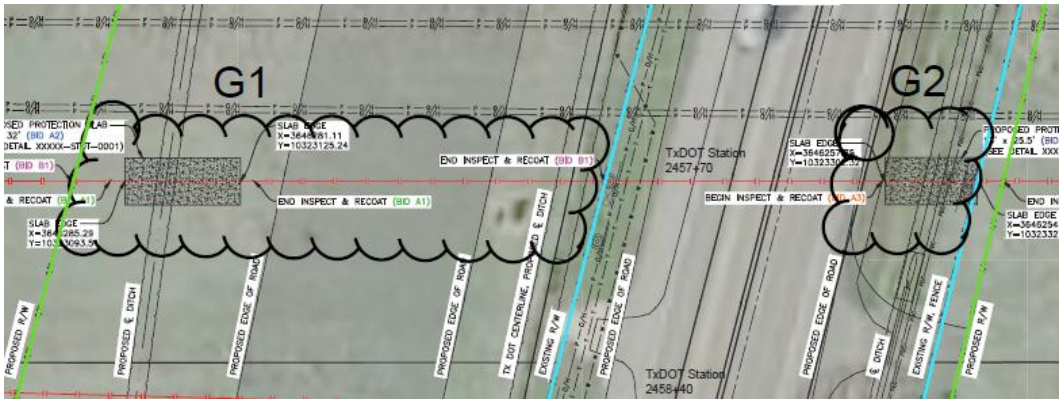
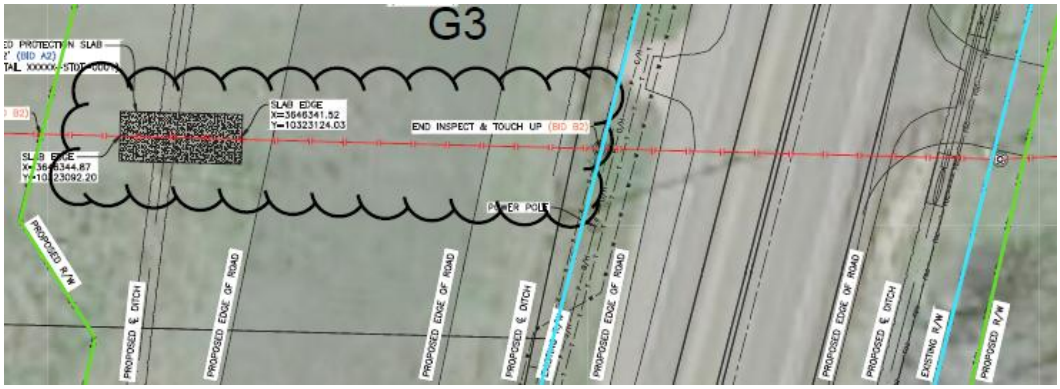
Crossing 1	
Crossing 2	

Figure 15. Case 8—Utility Relocation Plan.

SCP calculated the eligibility ratio by using the length method. As Figure 16 shows, TxDOT's participation was 71.50 percent. (The result of dividing 64 by 89.5 was 0.7151.) In Figure 16 SCP aggregated pipeline lengths by plan sheet. The pipe lengths that SCP used for the reimbursement eligibility calculation corresponded to the locations where the concrete slabs were placed, therefore ignoring the total length of the pipe that was inspected and recoated.

Plan Sheet or Page#	In Easement (Eligible) Existing # of Poles or LF	In Public ROW (Ineligible) Existing # of Poles or LF
11	32'	25.5'
12	32'	
Totals	64	25.5

Total Existing LF (Eligible)	64
Total Existing LF (Ineligible)	25.5
Total Existing LF	89.5
Total Existing # of Poles or LF (Eligible) divided by the Total Existing # of Poles or LF	71.50%

Figure 16. Case 8—Reimbursement Eligibility Calculation.

The total estimated utility relocation cost was $456,600.00. The cost estimate provided a breakdown of the total cost of materials, labor, and engineering. The agreement did not include replacement easement costs. Instead, SCP decided to retain the easement, as documented in a JUA. The agreement did not include elective betterments or salvage credit that could reduce the total cost. The eligible cost is 0.7150 × $456,600.00 = $326,469.00. (The utility agreement used 66.66 percent and arrived at an eligible cost of $304,370.00.) The agreement did not explain why the eligibility ratio used was different from the eligibility ratio calculation. As a reference, TxDOTCONNECT mentions the utility relocation of $456,600.00, an eligibility ratio of 71.50 percent, and a reimbursable amount of $326,469.00. TxDOTCONNECT also indicated the utility owner's name to be Enterprise Texas Pipeline. The review memorandum noted this issue and included a request to change the name to Seaway Crude Pipeline.

The standard utility agreement was fully executed on August 11, 2023. At that time, SCP estimated a start date of September 10, 2023 and an end date of October 10, 2023.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was simple and involved measuring the length of the concrete slabs, both inside the existing ROW (i.e., 25.5 ft) and in the private easements (64 ft) for a total of 89.5 ft. However, the scope of work included inspection on all pipe segments (total length: 359.5 ft) and recoating of two pipe segments (334 ft). The dollar amount associated with the inspection and recoating activities accounted for almost 40 percent of the total utility work. The dollar amount associated with each concrete slab was 20 percent of the total utility work. The utility relocation was not homogeneous, raising the question whether the length method was appropriate in a situation in which significant components of the relocation were localized.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by identifying three distinct locations based on scope of work and prepared an estimate of the utility relocation cost for each of those locations (Figure 15). The utility owner provided a disaggregated estimate for materials and labor for each crossing. However, the estimate did not include disaggregated engineering costs, other internal costs, and legal services. This limitation made it necessary to make assumptions to allocate those costs based on pipe length.

Table 23 summarizes the reimbursement eligibility calculation. The eligible cost is $257,156.14 for Location G1 and $106,453.66 for Location G2. Location G2 is fully contained inside the existing ROW, where the utility owner does not have an easement, and therefore the eligible cost is zero. These amounts would provide the basis for reimbursement. The total eligible cost is $363,609.80, which is higher than the original calculation (i.e., $326,469.00).

Table 23. Case 8—Alternative Reimbursement Eligibility Calculation.

Location	Reimbursement Eligibility	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
G1	100%	$257,156.14	$257,156.14	$257,156.14	—
G2	0%	$92,977.20	$92,977.20	—	$92,977.20
G3	100%	$106,453.66	$106,453.66	$106,453.66	—
Total	—	**$456,587.00**	**$456,587.00**	**$363,609.80**	**$92,977.20**

Comparison of Methodologies

Table 24 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 24. Case 8—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	Mixing segments with quite different eligibility ratios masks the specific reimbursement conditions associated with individual locations. In this case, the utility relocation was not homogeneous, raising the question whether the length method was appropriate in a situation in which significant components of the relocation were localized.
Each crossing location is managed separately	It enables greater accuracy in distinguishing reimbursable and non-reimbursable work. It shows the actual impact of each segment and relocation component by identifying which ones account for most of the reimbursable cost.	It requires disaggregated cost information by segment, which might not be provided by utility owners. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT. Currently, to account for each location separately, it would be necessary to execute separate utility agreements.

CASE 9—DALLAS DISTRICT: SH 5 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0047-04-031
ROW CSJ: 0047-04-038

The project involved widening from a 2-lane rural highway to a 4-lane urban highway on SH 5 from SH 121 to the North Collin County outer loop. The letting date was December 1, 2022. The low bid was $39,271,527.02. TxDOTCONNECT did not show ROW acquisition expenditures. However, the plans included in the utility agreement showed existing and proposed ROW lines, suggesting the project did include ROW acquisition. According to TxDOTCONNECT, the project required the relocation of electric and water utility facilities.

The North Collin Special Utility District (NCSUD) had three lines that interfered with the project (Figure 17):

- A 2-inch water line ran longitudinally outside the existing ROW and interfered with the proposed pavement. The selected resolution was to relocate 1,346 ft of 2-inch water line. The utility agreement did not mention the construction method.
- A 4-inch water line that was connected to the 2-inch water line outside the existing ROW and interfered with a proposed stormwater line. The selected resolution was to remove the pipe up to the tie-in point just outside the proposed ROW.
- A 5-inch water line crossing that did not have adequate vertical clearance with respect to the proposed stormwater line on the other side of the road. The selected resolution was to abandon the segment of the pipe under the existing pavement, remove the segment of the pipe between the existing pavement and the proposed ROW, and install 150-ft of 6-inch pipe encased in a 12-inch steel pipe via boring, connecting to the existing 4-inch pipe outside the proposed ROW.

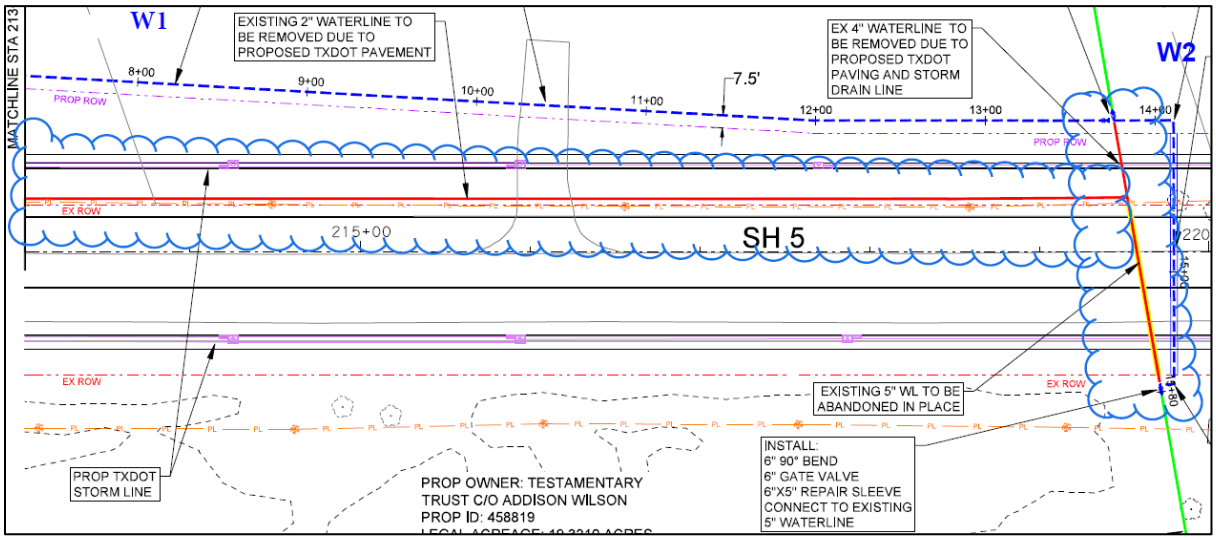


Figure 17. Case 9—Utility Relocation Plan.

NCSUD calculated a CER based on three separate calculations that used the length method for each pipe relocation. As Figure 18 shows, TxDOT's participation was 51.02 percent. The total estimated utility relocation cost was $138,537.25. However, the basis for the eligibility ratio calculation was only construction costs (i.e., $102,697.75). Other costs, such as engineering, construction administration, inspections, and ROW costs were included in the utility relocation cost but not in the reimbursement eligibility calculation.

Total				
Waterline Size (IN)	2	4	5	
Reimbursable Length (LF)	1382	39	4	
Non-Reimbursable Length (LF)	0	0	102	
Individual Eligibility Ratio	100.00%	100.00%	3.77%	
Total Cost of Adjustment	$ 47,615.00	$ 2,807.00	$ 52,275.75	
Sum of Total Cost of Adjustment				$ 102,697.75
Total Cost of Adjustment Times Eligibility Ratio	$ 47,615.00	$ 2,807.00	$ 1,972.67	
Sum of Total Cost of Adjustment Times Eligibility Ratio				$ 52,394.67
Composite Eligibility Ratio				51.02%

Figure 18. Case 9—Reimbursement Eligibility Calculation.

The relocation had an elective betterment ratio of 4.29 percent associated with an upgrade in line size from the existing 4-inch and 5-inch pipes to 6 inches. The agreement included a detailed tabulation of quantities and costs of materials and labor for the in-kind relocation and the alternative with the betterment. NCSUD applied the elective betterment percentage to the total cost ($138,537.25). The subtotal accounting for the elective betterment was (1 – 0.0429) × $138,537.25 = $132,594.00. The eligible cost, as shown in the utility agreement, was 0.5102 × $132,594.00 = $67,649.46.

The standard utility agreement was fully executed on October 27, 2022. At that time, NCSUD estimated a start date of November 30, 2022 and an end date of January 30, 2023.

CER Method Improvement

As mentioned, the basis for the reimbursement eligibility ratio calculation was only construction costs (i.e., $102,697.75). The agreement did not explain why other costs such as engineering, inspections, or ROW were not included in the reimbursement eligibility calculation. Providing this information in the utility agreement package would have made the review of the eligibility calculation easier to conduct, particularly considering that the elective betterment calculation used the entire utility relocation cost, not just the construction cost.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by dividing the utility relocation work into two logical phases. The first phase is associated with the longitudinal 2-inch pipe (i.e., W1 in Figure 17). The second phase is associated with the crossing (i.e., W2 in Figure 17). A review of the existing 4-inch pipe and the 5-inch pipe indicates that the resolution strategy for both pipes was the same (i.e., installing a 6-inch line crossing the highway spanning the proposed ROW).

The cost estimate in the utility agreement included disaggregated construction costs using installed quantities and unit costs. Other costs such as engineering, construction administration, inspections, and ROW costs were aggregated. Specific assumptions the research team made were as follows:

- All costs are prorated by length of pipe to be installed.
- All applicable costs (e.g., engineering costs, ROW costs, and inspections) are used in the reimbursement eligibility calculation.
- The amount of work outside the proposed ROW is minimal and necessary for the relocation work.
- The betterment calculation does not apply to the longitudinal 2-inch pipe installation. It only applies to the crossing.

Table 25 summarizes the reimbursement eligibility calculation. The eligible cost is $68,943.52 for Location W1 and $18,876.62 for Location W2. These amounts would provide the basis for reimbursement. The total eligible cost is $87,820.14. This amount is higher than the eligible cost included in the utility agreement (i.e., $67,649.46). However, the two amounts are not comparable because the utility agreement did not include all relevant costs in the reimbursement eligibility calculation, specifically engineering costs, ROW costs, and inspections.

Table 25. Case 9—Alternative Reimbursement Eligibility Calculation.

Location	Reimbursement Eligibility	Total Existing Length (ft)	Existing Length in Easement (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
W1	100%	1,382	1,382	$68,943.52	$68,943.52	$68,943.52	—
W2	29.66%	145	43	$69,593.73	$63,653.73	$18,876.62	$44,777.11
Total	—	**1,527**	**1,425**	**$138,537.25**	**$132,597.25**	**$87,820.14**	**$44,777.11**

Comparison of Methodologies

Table 26 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 26. Case 9—Methodology Comparison.

Methodology	Advantages	Disadvantages
CER method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It masks quality-control issues in situations in which cost elements are missing (e.g., engineering and inspection costs in this case).
Separate calculations and reimbursement eligibility for each location	It enables greater accuracy in distinguishing reimbursable and non-reimbursable work. It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing.	It requires disaggregated cost information by segment, which might not be provided by utility owners. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 10—DALLAS DISTRICT: US 67 INTERCHANGE PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0261-01-041
ROW CSJ: 0261-01-049

The project involves constructing an interchange on US 67 at Lake Ridge Parkway. The estimated letting date is March 4, 2026. The estimated construction cost is $44,818,956.56. The project includes the acquisition of ROW and the relocation of a gas line.

Atmos Energy had 2 lines (36-inch and 8-inch) that interfered with the project (Figure 19). The 36-inch steel transmission line crossed US 67 at an angle. The resolution involved abandoning the existing 36-inch gas line and the 42-inch steel casing and installing approximately 1,880 ft of 36-inch steel gas pipe, including a segment parallel to US 67 in a private easement and then a crossing at 90 degrees. (The utility agreement showed 2,236 ft as the total length of the 36-inch steel gas pipe.) The 8-inch steel gas line included a crossing and a longitudinal segment. The resolution strategy included changing the location of the crossing and replacing the longitudinal segment.

Atmos Energy calculated a CER based on the cost to relocate each line using the length method. As Figure 20 shows, TxDOT's participation was 39.21 percent. The total estimated utility relocation cost was $10,998,762.30. The estimate included a replacement easement cost. The relocation did not have elective betterments or salvage credit that could decrease the relocation cost. The eligible cost was 0.3921 × $10,998,762.30 = $4,312,614.70.

The standard utility agreement was fully executed on November 30, 2023. At that time, Atmos Energy estimated a start date of January 10, 2024 and an end date of May 10, 2024.

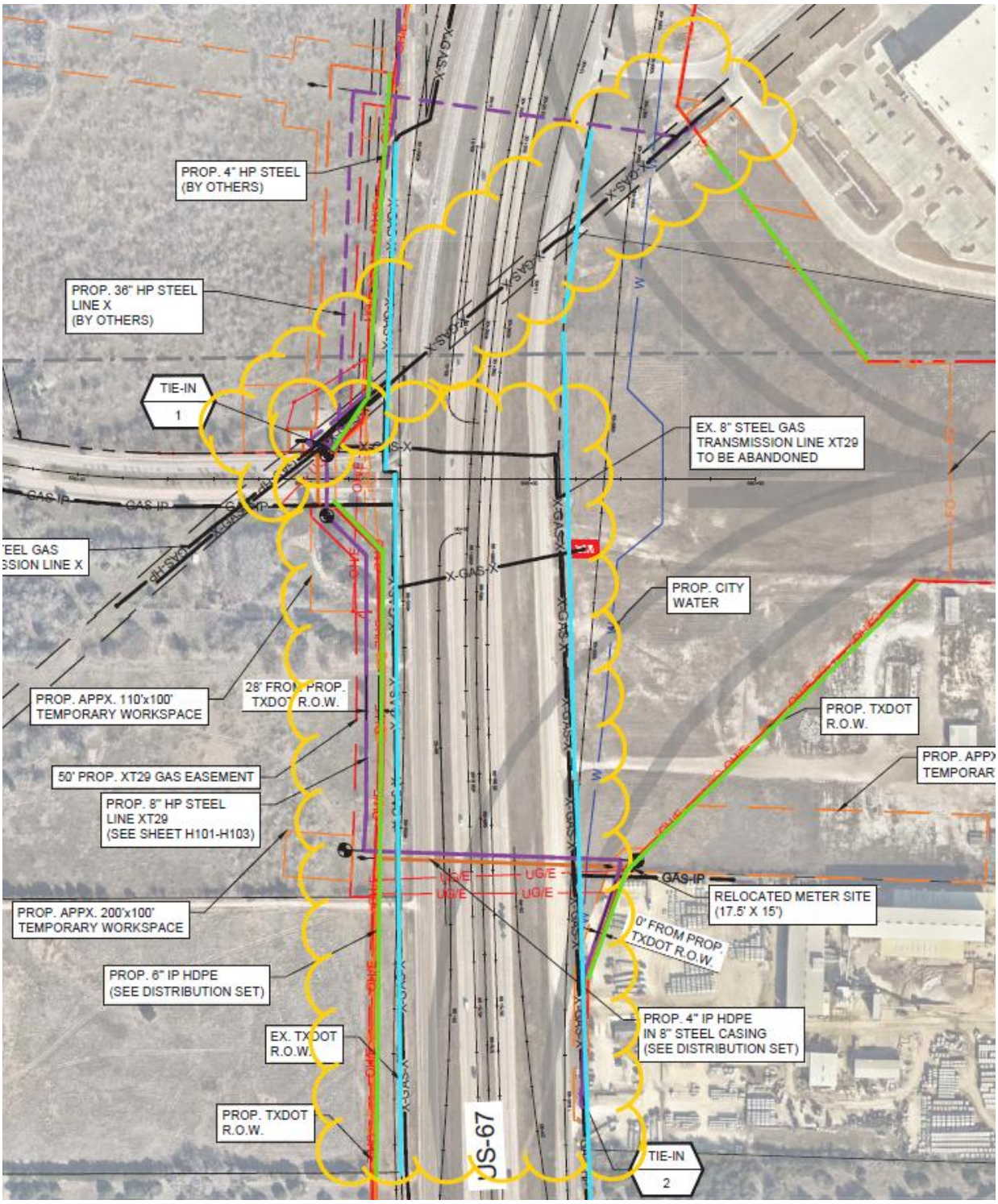


Figure 19. Case 10—Utility Relocation Plan.

Eligibility Ratio Calculations			
Line X			
Length of Line in Existing TxDOT ROW		516	LF
Length of Line in Prop TxDOT ROW		954	LF
Eligible Length for Reimbursement		438	LF
Eligibility Ratio		45.91%	
A - Total Cost of Line X Relocation		$ 9,133,183.77	
Y - Eligible Cost of Line X Relocation		$ 4,193,222.74	
Line XT29			
Length of Line in Existing TxDOT ROW		1933	LF
Length of Line in Prop TxDOT ROW		2065	LF
Eligible Length for Reimbursement		132	LF
Eligibility Ratio		6.39%	
B - Total Cost of Line XT29 Relocation		$ 1,865,578.53	
Z - Eligible Cost of Line XT29 Relocation		$ 119,252.48	
Composite Eligibility Ratio (CER)			
Y + Z - Eligible Cost of Line X AND XT29		$ 4,312,475.21	
A + B - Total Cost of Line X and XT29		$ 10,998,762.30	
CER = (Y + Z) / (A + B) * 100%		39.21%	

Figure 20. Case 10—Reimbursement Eligibility Calculation.

CER Method Improvement

The CER reimbursement eligibility calculation for this utility agreement was straightforward and involved using the length method for both pipelines, calculating the eligible cost for each pipeline, and adding these costs to arrive at the CER.

Alternative Reimbursement Eligibility Calculation

Although the utility owner already had separate cost estimates for both segments, the research team prepared an eligibility cost calculation that did not involve using a CER. Table 27 summarizes the reimbursement eligibility calculation for each segment. These cost estimates would provide the basis for reimbursement.

Table 27. Case 10—Alternative Reimbursement Eligibility Calculation.

Segment	Reimbursement Eligibility	Length (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
Line X	45.91%	954	$9,133,183.77	$9,133,183.77	$4,193,222.74	$4,939,961.03
Line XT29	6.39%	2,065	$1,865,578.53	$1,865,578.53	$119,252.48	$1,746,326.05
Total	—	**3,019**	**$10,998,762.30**	**$10,998,762.30**	**$4,312,475.21**	**$6,686,287.09**

Comparison of Methodologies

Table 28 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 28. Case 10—Methodology Comparison.

Methodology	Advantages	Disadvantages
CER method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	None.
Separate calculations and reimbursement eligibility for each location	It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing.	Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT. Currently, to account for each location separately, it would be necessary to execute separate utility agreements.

CASE 11—EL PASO DISTRICT: US 62 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0374-02-097
ROW CSJ: 0374-02-103

The project involved the construction of main lanes and frontage roads of US 62 (Montana Avenue) between Global Reach Drive and FM 659 (Zaragoza Road) in El Paso County. The letting date was October 1, 2018. The low bid was $143,754,248.05. The project included the acquisition of ROW and several utility relocations, including electric, communications, gas, water, and wastewater.

Charter Communications had eight locations where lines interfered with the project: one aerial line running longitudinally, one underground crossing, and six aerial crossings (Figure 21). The aerial communication cables were attached to existing El Paso Electric Company (EPEC) poles. Charter Communications relocated the longitudinal line to the proposed EPEC poles. The resolution included a forced betterment for the relocation of 977 ft of aerial cable to 2-inch underground high-density polyethylene (HDPE) conduits because EPEC went underground in that location. For the 7 crossings, the resolution was to replace them with 3 underground crossings of 2-inch HDPE conduits encased in 4-inch HDPE pipes.

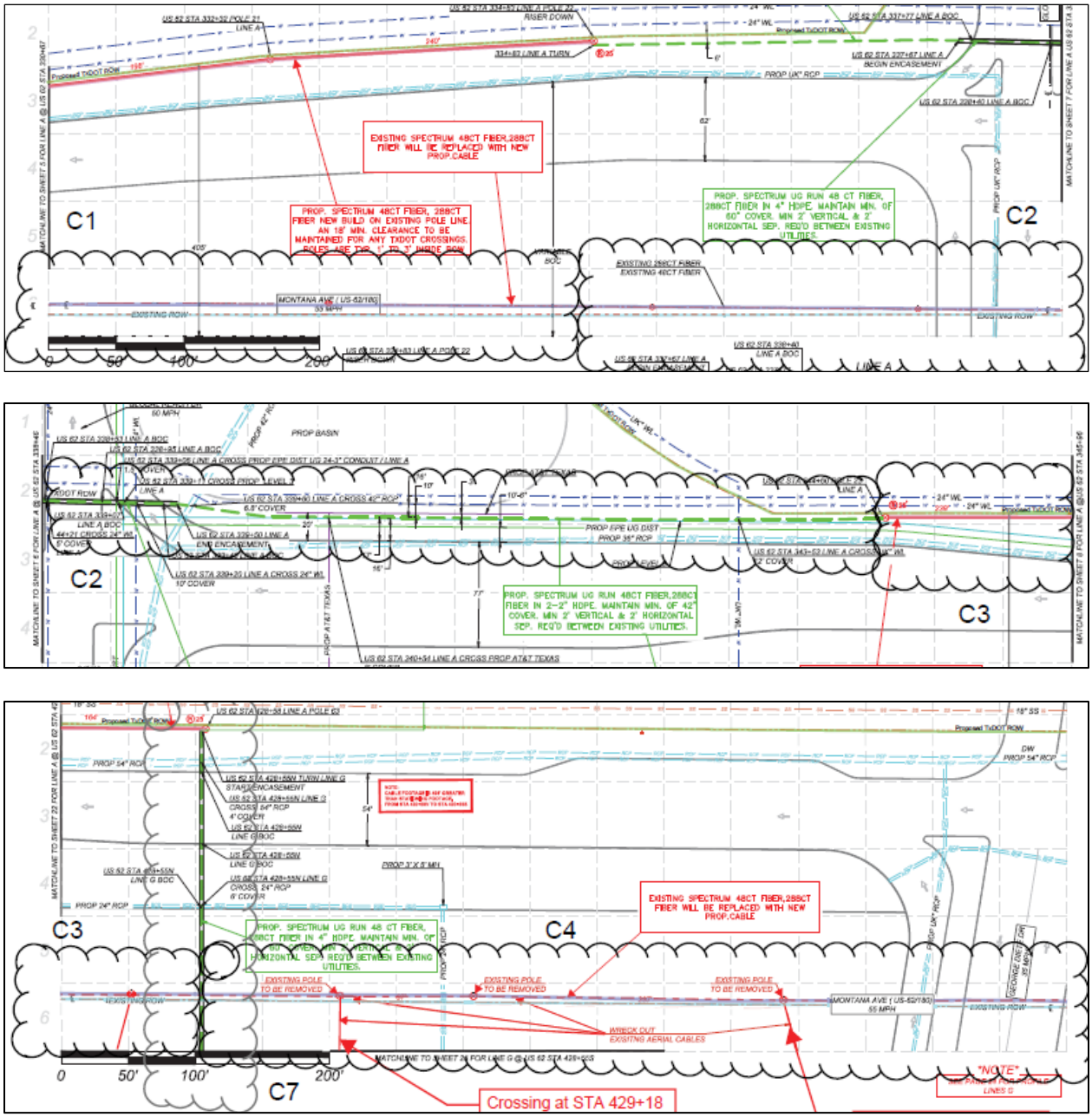


Figure 21. Case 11—Utility Relocation Plan.

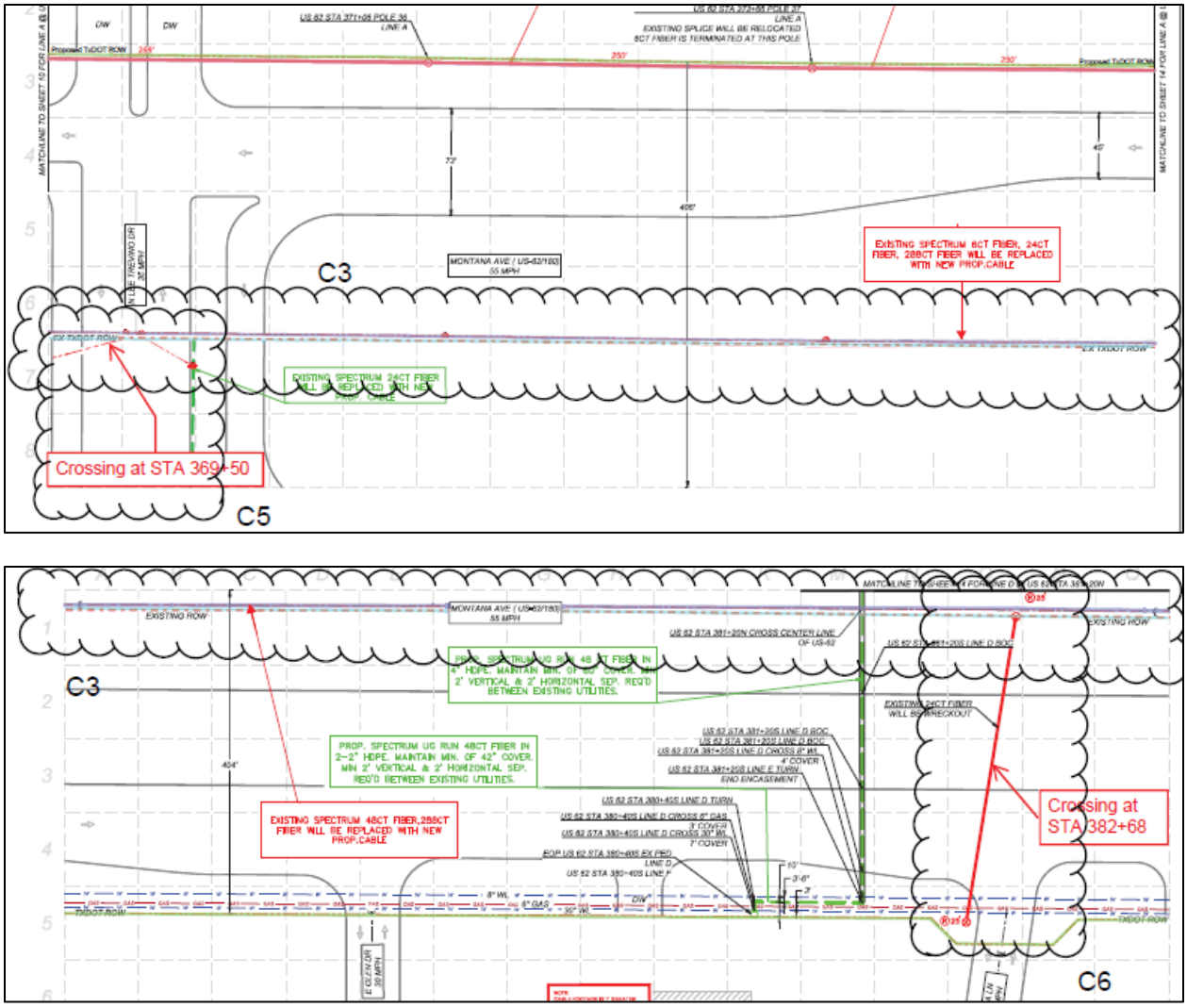


Figure 21. Case 11—Utility Relocation Plan (continued).

The relocation of the longitudinal line was 100 percent reimbursable. The crossings were not reimbursable because they were located inside the existing ROW. Charter Communications calculated a CER. As Figure 22 shows, TxDOT's participation was 86.94 percent.

The total utility relocation cost was $130,673.96. This amount included the work needed to make the lines functional again, including the length of the line up to the closest splice point. The utility agreement included a detailed tabulation of the cost of materials and labor for the entire utility relocation but did not break down the total cost associated with each location. In addition to the forced betterment described above, the relocation included an elective betterment that involved upsizing existing 24-strand and 72-strand fiber cables to 48-strand and 144-strand fiber cables, respectively. The utility agreement did not explicitly say it, but the elective betterment was in connection with the crossings, which were not eligible for reimbursement. In addition, none of the relocations had salvage

credit that could reduce the total cost further. The eligible cost was 0.8694 × $130,673.96 = $113,607.94.

The standard utility agreement was fully executed on November 10, 2023 and included a utility conflict list with information such as conflict number, SUE level, stationing, location with respect to the ROW, reimbursement eligibility, conflict description, and resolution description. This document made it easier to understand the plans and the selected resolution for each conflict.

U15934
ELIGIBILITY RATIO
CHARTER COMMUNICATIONS
RCSJ: 0374-02-103
CSJ: 0374-02-097

TOTAL COST: $ 130,673.96

Description of Item	Total LF	LF in Easement	LF in TxDOT ROW
Logitudinal line from STA 305+89 to STA 432+38	12,649	12,649	0
Crossing at STA 328+37	204	0	204
Crossing at STA 369+50	401	0	401
Crossing at STA 382+68	219	0	219
Crossing at STA 403+70	260	0	260
Crossing at STA 424+80	328	0	328
Crossing at STA 429+18	268	0	268
Crossing at STA 431+58	220	0	220
Total:	14,549	12,649	1,900

Eligibility Ratio Calculation	LF	Cost of Adjustment (A,B)	Eligibility	Y, Z Factors
LF of Existing Cables in TxDOT ROW	1,900	$17,066.02	0.00%	0
LF of Existing Cables in Easements	12,649	$113,607.94	100.00%	$113,607.94
TOTAL:	14,549	$130,673.96	86.94%	$113,607.94

Eligibility Ratio (Y+Z)/(A+B) =	86.94%
TxDOT Portion =	$113,607.94

Figure 22. Case 11—Reimbursement Eligibility Calculation.

CER Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. It involved measuring the length of the existing cable inside the existing ROW and the length of the existing cable in private easement. Subsequently, Charter Communications used a CER to calculate the eligible cost. The plans showed the existing cable length and the proposed cable length for the longitudinal installation but did not provide the lengths for the crossings.

Most of the existing cable was attached to the existing EPEC poles. As a reference, if the utility owner had used the pole method, the eligibility ratio would have been 91.18 percent, based on 31 poles located in private easement and 3 poles located inside the existing ROW. The utility agreement did not explain why the pole method was not considered for this utility agreement.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by dividing locations according to two criteria. The first criterion was whether a cable segment was inside or outside the existing ROW. The second criterion was the construction method. For the longitudinal installation, the resolution for some segments was to relocate the cable underground, but for other segments it was to attach the cable to the proposed EPEC poles.

The cost estimate in the utility agreement was disaggregated by materials and labor needed for the aerial installation and the underground installation. However, the plans did not provide enough detail of the items and accessories installed. As a result, it was only possible to prepare a high-level estimate of the cost associated with each location based on the length of the proposed installation.

Table 29 summarizes the reimbursement eligibility for each location. The amounts shown would provide the basis for reimbursement. The total eligible cost of $109,672.87 was lower than the eligible cost included in utility agreement (i.e., $113,607.94). Lengths shown correspond to the length of each proposed installation. There was significant difference between the cost for the aerial installation and the cost of the underground installations ($8.12/ft versus $17.78/ft). This kind of differentiation would not be possible if costs are aggregated for the entire installation.

Table 29. Case 11—Alternative Reimbursement Eligibility Calculation.

Location	Reimbursement Eligibility	Length (ft)	Category	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
C1	100%	2,171	Aerial	$17,629.78	$17,629.78	$17,629.78	—
C2	100%	670	Underground	$11,913.63	$11,913.63	$11,913.63	—
C3	100%	8,591	Aerial	$69,763.91	$69,763.91	$69,763.91	—
C4	100%	588	Underground	$10,455.55	$10,455.55	$10,455.55	—
C5	0%	391	Underground	$6,952.58*	$6,952.58	—	$6,952.58
C6	0%	386	Underground	$6,863.67*	$6,863.67	—	$6,863.67
C7	0%	399	Underground	$7,094.83*	$7,094.83	—	$7,094.83
Total	—	**13,196**	—	**$130,673.96**	**$130,673.96**	**$109,672.87**	**$20,911.09**

* The utility agreement did not include a cost estimate with the elective betterment, probably because the relocation was not reimbursable.

Comparison of Methodologies

Table 30 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 30. Case 11—Methodology Comparison.

Methodology	Advantages	Disadvantages
CER method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	Mixing segments with quite different reimbursement eligibility levels hides specific reimbursement conditions that affect individual locations. In this case, the longitudinal installation was 100 percent reimbursable, but the crossings were not reimbursable because they were located inside the existing ROW.
Separate calculations and reimbursement eligibility for each segment	It enables greater accuracy in distinguishing reimbursable and non-reimbursable work. It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing. It facilitates a clearer understanding of differences in utility relocation cost per linear foot among different construction methods (e.g., underground vs. aerial).	It requires disaggregated cost information by segment, which might not be provided by utility owners. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 12—PARIS DISTRICT: SH 276 CONSTRUCTION PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 1290-07-001
ROW CSJ: 1290-07-002

The project involved constructing a 5-lane highway on SH 276 from FM 36 to SH 34. The letting date was October 1, 2020. The low bid was $14,191,646.90. The project included ROW acquisition and several utility relocations, including electric, communication, and water.

Farmers Electric Cooperative (FEC) had an aerial electric distribution line that interfered with the pavement structure of the new highway alignment (Figure 23). The resolution strategy included (a) removing 3 30-ft wood poles, 2 35-ft wood poles, 24 40-ft wood poles, 27 45-ft wood poles, and the corresponding lines; and (b) installing 3 new 35-ft wood poles, 2 40-ft wood poles, 31 45-ft wood poles, 19 50-ft wood poles, 9 55-ft wood poles, 2 60-ft wood poles, and the corresponding lines.

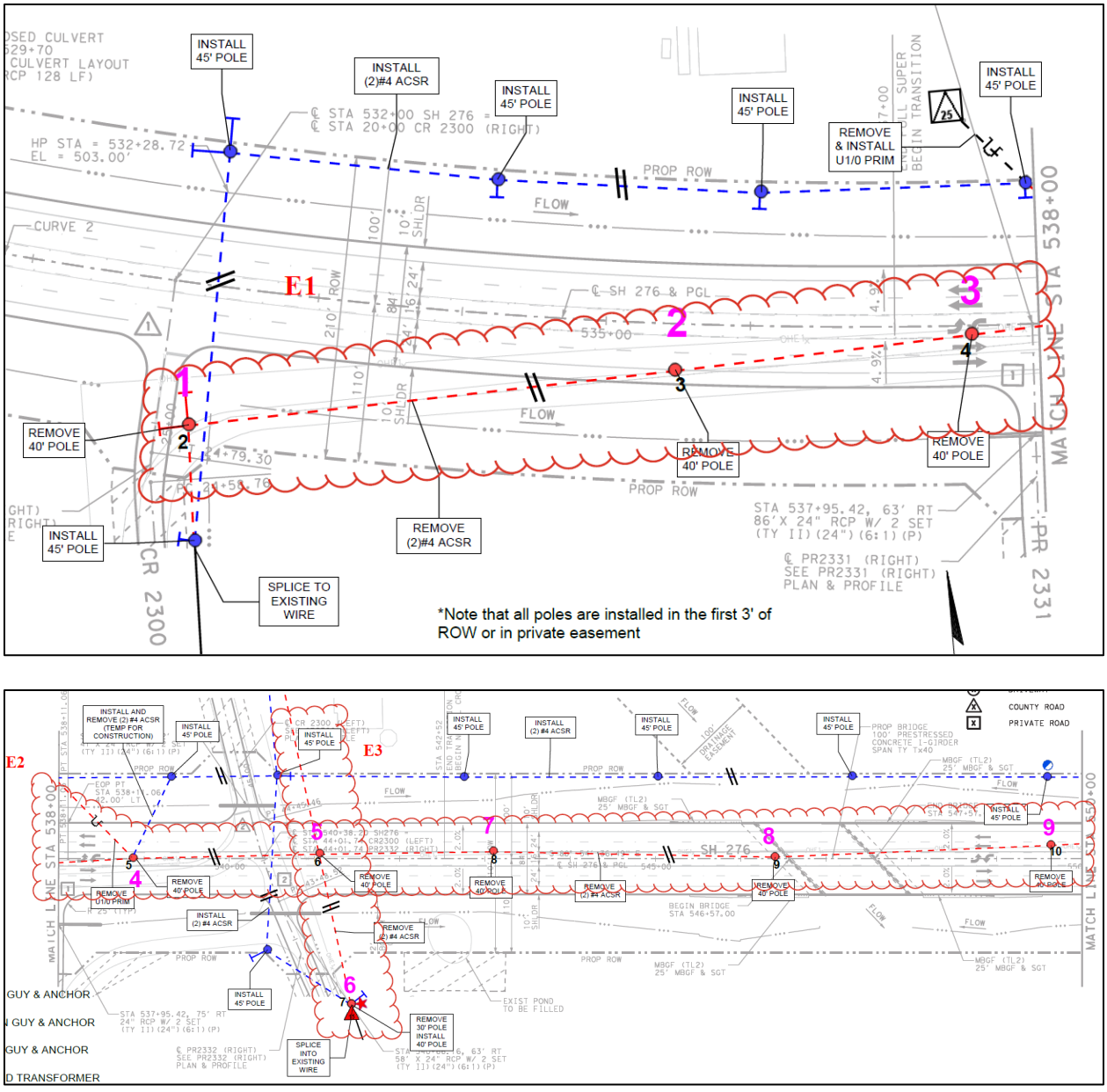


Figure 23. Case 12—Utility Relocation Plan.

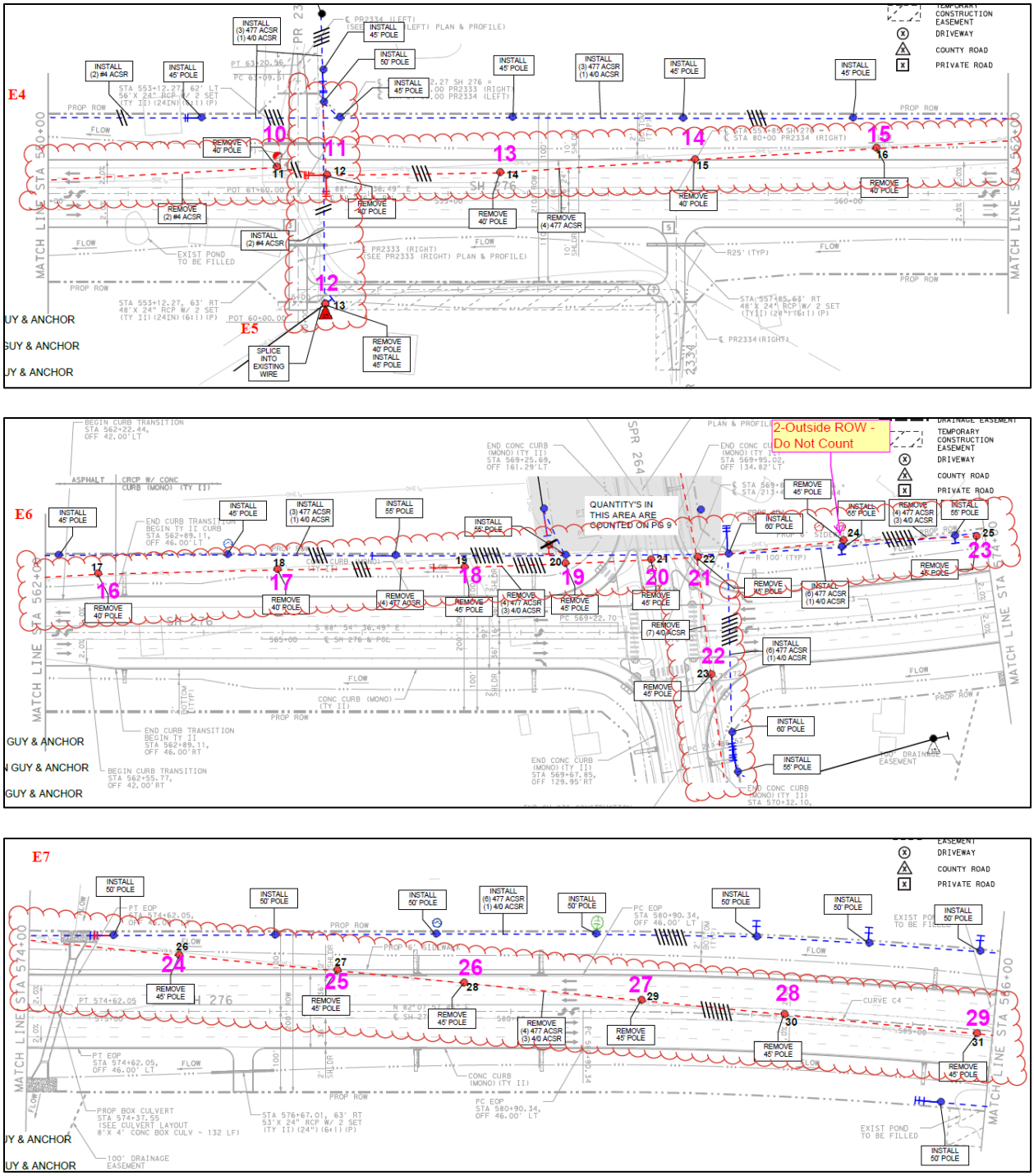


Figure 23. Case 12—Utility Relocation Plan (continued).

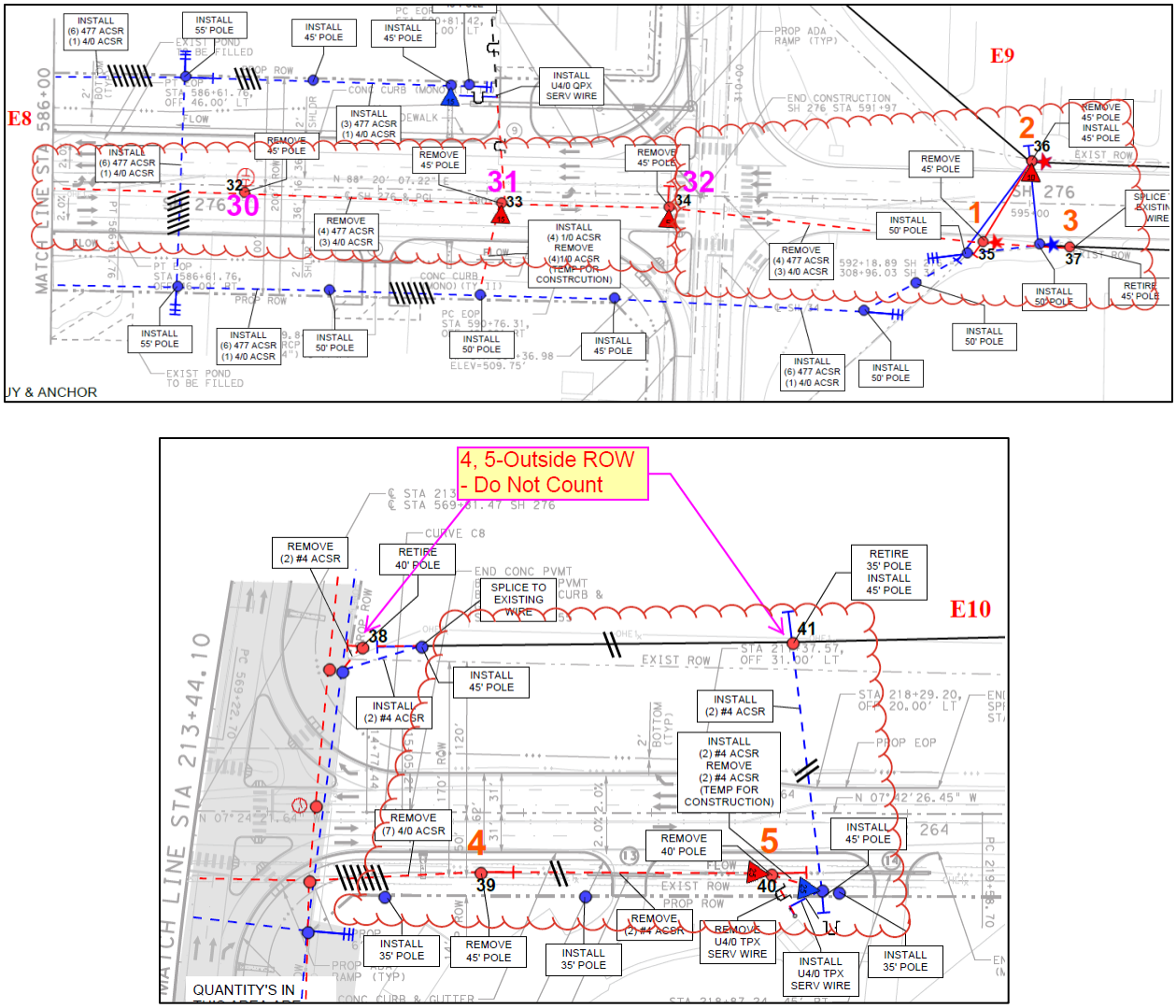


Figure 23. Case 12—Utility Relocation Plan (continued).

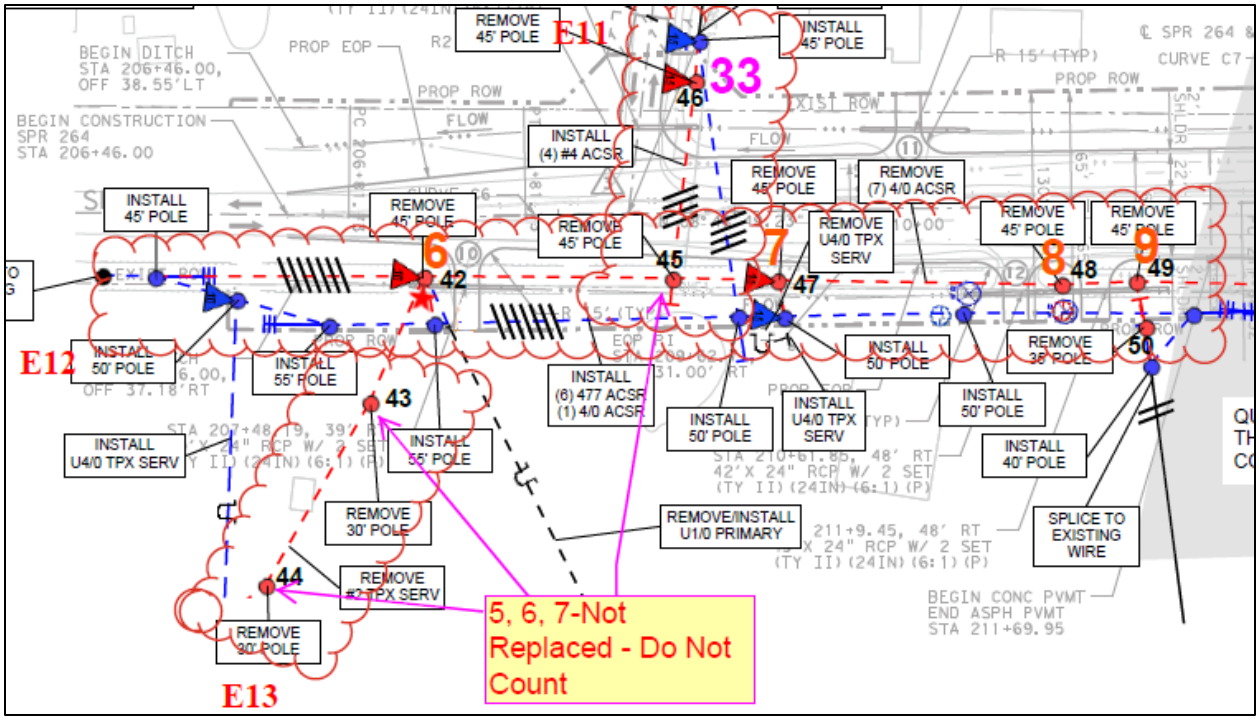


Figure 23. Case 12—Utility Relocation Plan (continued).

FEC calculated the reimbursement eligibility ratio using the pole count method. The procedure included counting the number of poles for each page on the plans, determining which poles were in private easement, and calculating the eligibility ratio. As Figure 24 shows, TxDOT's participation was 78.57 percent. (The standard utility agreement included another table showing the eligibility ratio as 78.5714 percent.)

The total estimated utility relocation cost was $399,465.91. The relocation had an elective betterment that involved upgrading the conductor cable from 4/0 ACSR to 477 ACSR. The betterment was 8.21498 percent (Figure 25). The relocation cost without the elective betterment was (1 – 0.0821498) × $399,465.91 = $366,649.87. (As shown in the utility agreement, the eligible cost was 0.785714 × $366,669.76 = $288,081.94.) The standard utility agreement included a detailed tabulation of the cost of materials, labor, and other categories for the alternative with the betterment and for the relocation in-kind. The standard utility agreement was fully executed October 5, 2020. At that time, FEC estimated a start date of August 10, 2020 and an end date of October 16, 2020.

TxDOTCONNECT includes a reference to a supplemental agreement to account for additional costs due to supply chain delays during COVID-19. Unfortunately, the supplemental agreement was not available to the research team, and therefore, the analysis here uses the dollar amounts included in the standard utility agreement.

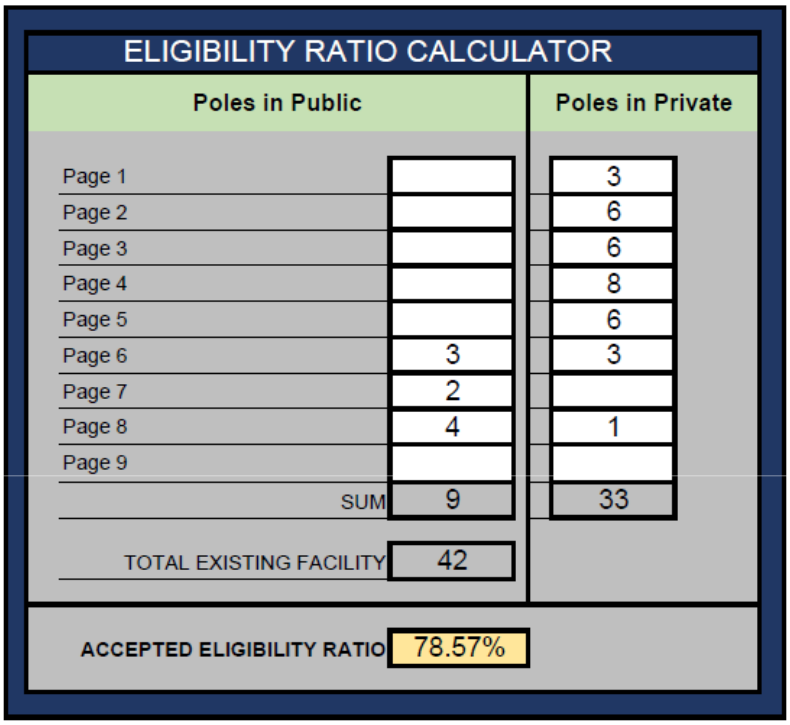


Figure 24. Case 12—Reimbursement Eligibility Calculation.

Underground Materials Cost	$ 3,780.88
Underground Construction Cost	$ 2,805.86
Underground Retirement Cost	$ 1,039.13
Tree / Brush Clearing & Surveing Cost Estimate	$ 98,410.00
Farmers Employee Cost Estimate	$ 8,514.85
Betterment Retirement Cost	$ 51,577.95
Betterment Materials Cost	$ 143,299.75
Betterment Construction Labor Cost:	$ 90,037.49
Betterment Cost Estimate (B)	**$ 399,465.91**

Underground Materials Cost	$ 3,780.88
Underground Construction Cost	$ 2,805.86
Underground Retirement Cost	$ 1,039.13
Tree / Brush Clearing & Surveing Cost Estimate	$ 98,410.00
Farmers Employee Cost Estimate	$ 8,514.85
In Kind Retirement Cost	$ 48,410.91
In Kind Materials Cost	$ 124,656.97
In Kind Construction Labor Cost:	$ 79,031.27
In Kind Materials Cost Estimate (A)	**$ 366,649.87**

B - A = Betterment (X)	**$ 32,816.04**
X / B = Elective Betterment Credit Precentage	**8.21498%**

Figure 25. Case 12—Betterment Ratio Calculation.

Pole Count Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. It involved counting the poles located inside the existing ROW and the poles outside the existing ROW. The plans included an identification number for each pole, color coding the label to differentiate which of them were eligible. Most of the highway construction was on a new alignment, and most affected poles were in private easements. However, the plans did not clearly show which areas corresponded to greenfield construction. Sheets typically showed the location of the proposed ROW, but it was not immediately obvious that there was not an existing ROW. Adding this information would have made the review process easier.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by identifying 13 locations, using as a main criterion whether a line segment was inside the existing ROW (in which case the relocation was not reimbursable) or outside the existing ROW (in which case the relocation was 100 percent reimbursable). The utility relocation work was inside the proposed ROW, except for six crossings that included the installation of poles outside the proposed ROW. A cursory review of the proposed installation confirmed that these poles were necessary for the utility relocation work, not for the convenience of the utility owner.

The utility owner provided a disaggregated estimate for materials and labor for the relocation. The plans included the poles to be removed or installed, length and specifications of the wire, and appurtenances such as transformers and guy wires. This information was essential to map the list of materials to each individual location. However, the estimate did not include disaggregated engineering costs, inspection, and other internal costs, which made it necessary to make assumptions to allocate these costs based on the cost of materials and labor associated with each location.

Table 31 summarizes the reimbursement eligibility calculation for each location. These cost estimates would provide the basis for reimbursement. The total eligible cost of $252,543.45 was lower than the amount included in the utility agreement (i.e., $288,081.94). However, this is a coincidence given the assumptions described above. If the utility owner had provided disaggregated costs for each location, the total eligible cost would have been different.

Table 31. Case 12—Alternative Reimbursement Eligibility Calculation.

Location	Reimbursement Eligibility	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
E1	100%	$18,186.96	$16,692.91	$16,692.91	—
E2	100%	$24,800.40	$22,763.06	$22,763.06	—
E3	0%	$8,817.92	$8,093.53	—	$8,093.53
E4	100%	$24,938.18	$22,889.52	$22,889.52	—
E5	0%	$7,440.12	$6,828.92		$6,828.92
E6	100%	$75,227.89	$69,047.93	$69,047.93	—
E7	100%	$72,747.85	$66,771.63	$66,771.63	—
E8	100%	$52,769.75	$48,434.72	$48,434.72	—
E9	0%	$48,223.01	$44,261.50	—	$44,261.50
E10	0%	$24,800.40	$22,763.06	—	$22,763.06
E11	100%	$6,475.66	$5,943.69	$5,943.69	—
E12	0%	$26,178.20	$24,027.67	—	$24,027.67
E13	0%	$8,859.56	$8,131.75	—	$8,131.75
Total	—	**$399,465.91**	**$366,649.87**	**$252,543.45**	**$114,106.42**

Comparison of Methodologies

Table 32 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 32. Case 12—Methodology Comparison.

Methodology	Advantages	Disadvantages
Pole count method	It is straightforward and simple to calculate, provided the plans clearly show whether poles have a property interest associated with them. The same eligibility ratio is used for partial and final payments.	It ignores the amount of linear infrastructure that might have a property interest associated with them. This risk was low given the high number of poles involved in the utility relocation.
Separate calculations and reimbursement eligibility for each segment	It facilitates a clearer understanding of cost variations and reimbursement eligibility inside the work area. This benefit was not immediately clear given the uniform spatial distribution of poles.	It requires disaggregated cost information by segment, which might not be provided by utility owners. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 13—PHARR DISTRICT: FM 494 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0864-01-068
ROW CSJ: 0864-01-072

The project involves widening FM 494 from 2 lanes to 4 lanes from SH 107 to FM 676. The letting date was October 1, 2024. The low bid was $19,548,135.00. The project included the acquisition of ROW and several utility relocations, including electric, communications, gas, water, and wastewater.

Texas Gas Service had a 12-inch gas pipeline that interfered with the proposed storm sewer. At that location, the highway project did not include new ROW. As Figure 26 shows, the selected resolution was to abandon 620 ft of existing pipe, remove the segment of pipe inside the existing ROW during construction, clear a section of brush prior to boring, and install 620 ft of 12-inch steel pipe at a deeper depth than the existing pipeline. The construction method was horizontal directional drilling, with a sufficient depth of cover to ensure a 5-ft vertical clearance under the bottom of the storm sewer gravel bed. The proposed line also had to clear an existing drainage canal.

The existing ROW was 120 ft wide. However, the plans did not clearly show the location of the existing ROW. The crossing was at an angle (almost 45 degrees), but it was not clear why the relocation did not include a variance.

Texas Gas Service calculated the eligibility ratio by using the length method. As Figure 27 shows, TxDOT's participation was 50.00 percent. The eligibility calculation was based on ROW widths, not pipe lengths. In this case, it did not matter because the pipeline followed a straight line. The plans showed a JUA, but it was not clear why this agreement covered half of the existing ROW.

The total estimated utility relocation cost was $334,202.41. This amount included the work needed to make the pipeline functional again, involving the installation of the pipeline outside the existing ROW up to the tie-in points. The resolution did not have elective betterments or salvage credit that could reduce the total cost. As a result, the eligible cost was 0.5000 × $334,202.41 = $167,101.21. The standard utility agreement was fully executed on July 25, 2023. At that time, Texas Gas Service estimated a start date of September 11, 2023 and an end date of October 20, 2023.

On November 6, 2023, TxDOT and Texas Gas Service executed a supplemental agreement due to a change in the schedule and a revision of the eligibility ratio to 100 percent. The utility owner provided documentation of an existing easement covering the entire line. The utility owner also kept the property interest through a JUA. At that time, Texas Gas Service estimated a start date of November 13, 2023 and an end date of December 22, 2023. On January 23, 2024, TxDOT and Texas Gas Service executed a second supplemental

agreement to update the schedule. At that time, Texas Gas Service estimated a start date of March 4, 2024 and an end date of April 4, 2024.

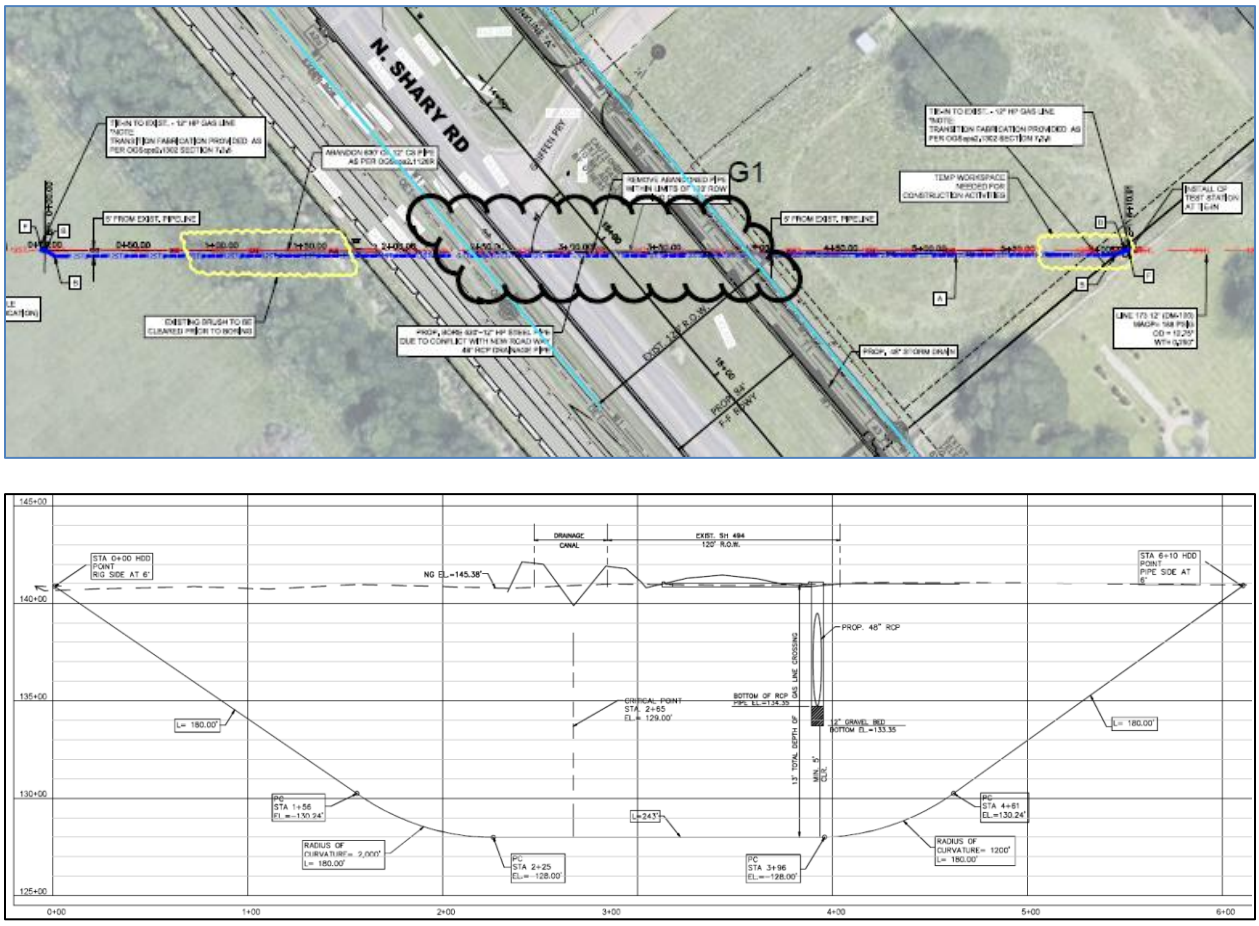


Figure 26. Case 13—Utility Relocation Plan and Profile.

ELIGIBILITY RATIO CALCULATOR			
Calculation for Overhead Installation by **Number of Eligible Poles**		Calculation for Underground or Overhead by **Length of Existing Facility**	
Number of EXISTING poles in conflict that are both OUTSIDE of existing ROW, and INSIDE of Proposed ROW. (in easement)		Length of existing facility in conflict that is both **outside of the existing ROW** and **inside of proposed ROW**. EASEMENT	60
Number of existing Poles in conflict that are inside of the existing ROW. (present by permit)		Length of the existing facility in conflict **inside of the existing ROW**. PERMIT	60
TOTAL number of Poles in Conflict	0	TOTAL length of the existing facility within proposed TxDOT ROW.	120
ELIGIBILITY IF CALCULATED BY POLES	0.00%	ELIGIBILITY IF CALCULATED BY LENGTH	50.00%
ACCEPTED ELIGIBILITY RATIO	50.00%		

Figure 27. Case 13—Reimbursement Eligibility Calculation.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward and involved using the length method for one crossing. The plans did not clearly show the existing ROW lines. Showing this information on the plans would have made the review process easier.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by considering the utility relocation cost inside the proposed ROW and any impact associated with construction activity outside the proposed ROW. The utility relocation included installing 620 ft of 12-inch steel pipe using directional drilling, of which approximately 400 ft were outside the existing ROW (225 ft on one side and 185 ft on the other side). The distance to the tie-in points outside the existing ROW was reasonable and necessary for the utility relocation considering the depth of cover requirement (i.e., approximately 14 ft under the road and 5 ft under the bottom of the storm sewer gravel bed). Table 33 summarizes the reimbursement eligibility calculation. This cost estimate would provide the basis for reimbursement. The eligible cost is $334,202.41, which corresponds to the utility relocation cost because the relocation is 100 percent reimbursable.

Table 33. Case 13—Alternative Reimbursement Eligibility Calculation.

Total Existing Length (ft)	Existing Length in Easement (ft)	Length to Be Installed (ft)	Utility Relocation Cost	Eligible Cost	Non-Eligible Cost
620.00	620.00	620.00	$334,202.41	$334,202.41	—

Comparison of Methodologies

Table 34 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 34. Case 13—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It increases the risk of not detecting inaccurate results when plans are not clear or detailed, which happened in this case. It resulted in a 50% eligibility ratio, which in this case underestimated the amount of work outside the proposed ROW, which was necessary to meet TxDOT depth requirement.
Separate calculations and reimbursement eligibility for each segment	It ensures that reimbursement considers conditions required by TxDOT, such as additional depth under the highway, which requires relocation work beyond the proposed ROW. It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing.	Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 14—SAN ANTONIO DISTRICT: FM 3351 BRIDGE REPLACEMENT PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 3212-05-013
ROW CSJ: 3212-05-017

The project involved reconstructing the existing bridge on FM 3351 at Cibolo Creek and constructing a center 2-way left-turn lane, sidewalks, and shared use path. The letting date was February 1, 2024. The low bid was $12,558,077.55. The project included the acquisition of ROW and several utility relocations, including electric, communications, and water.

The City of Fair Oaks Ranch had approximately 1,175 ft of a 6-inch water line that interfered with the proposed ditch and grading (Figure 28). Approximately 1,400 ft of a 4-inch water line also interfered with the proposed grading, a driveway, and a culvert. The lines were mostly longitudinal. The resolution selected in both cases was to remove and replace the water lines at least 3 ft below the existing grade inside the proposed ROW. Some segments were inside the existing ROW. Other segments were in a private easement inside the proposed ROW.

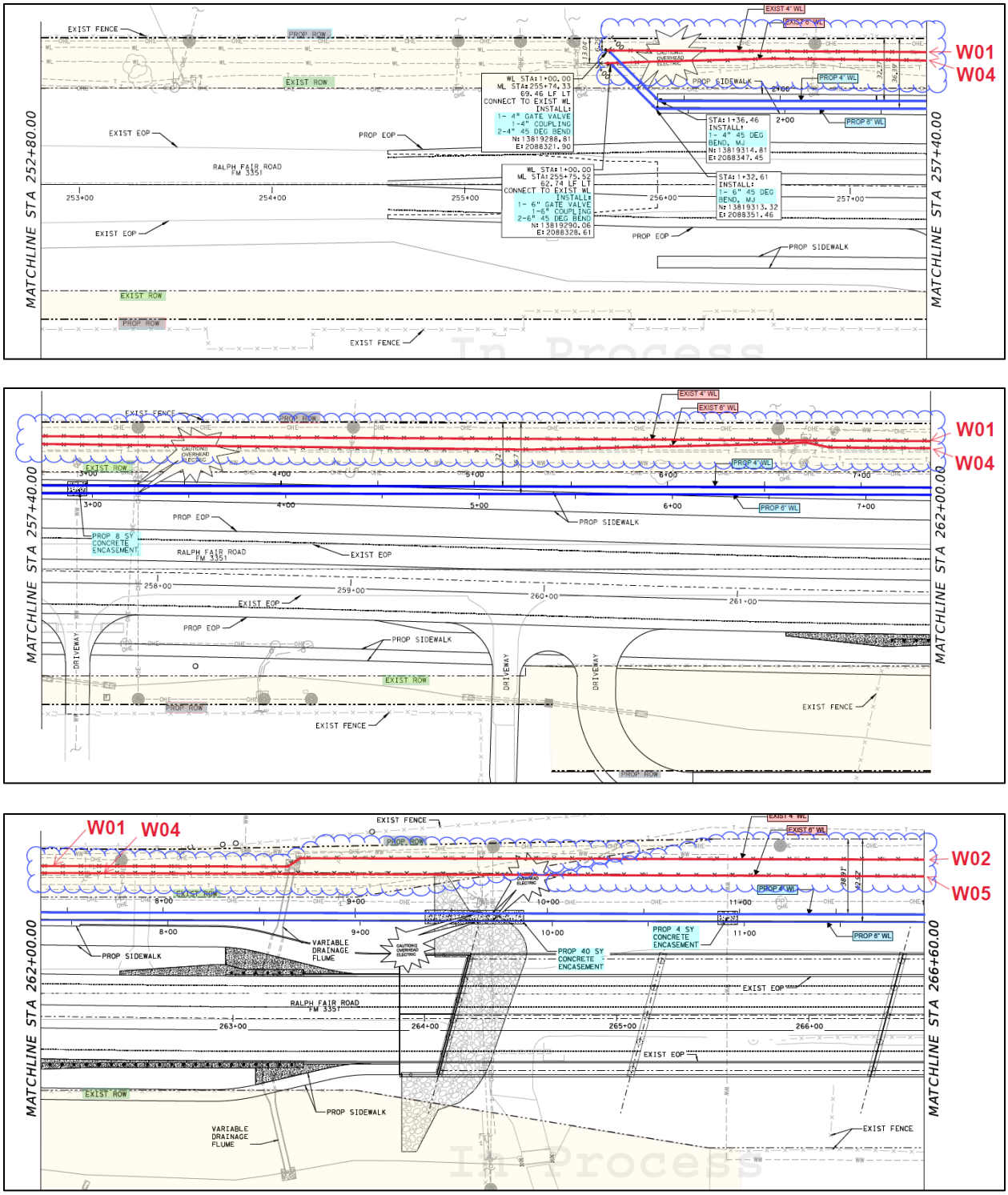


Figure 28. Case 14—Utility Relocation Plan.

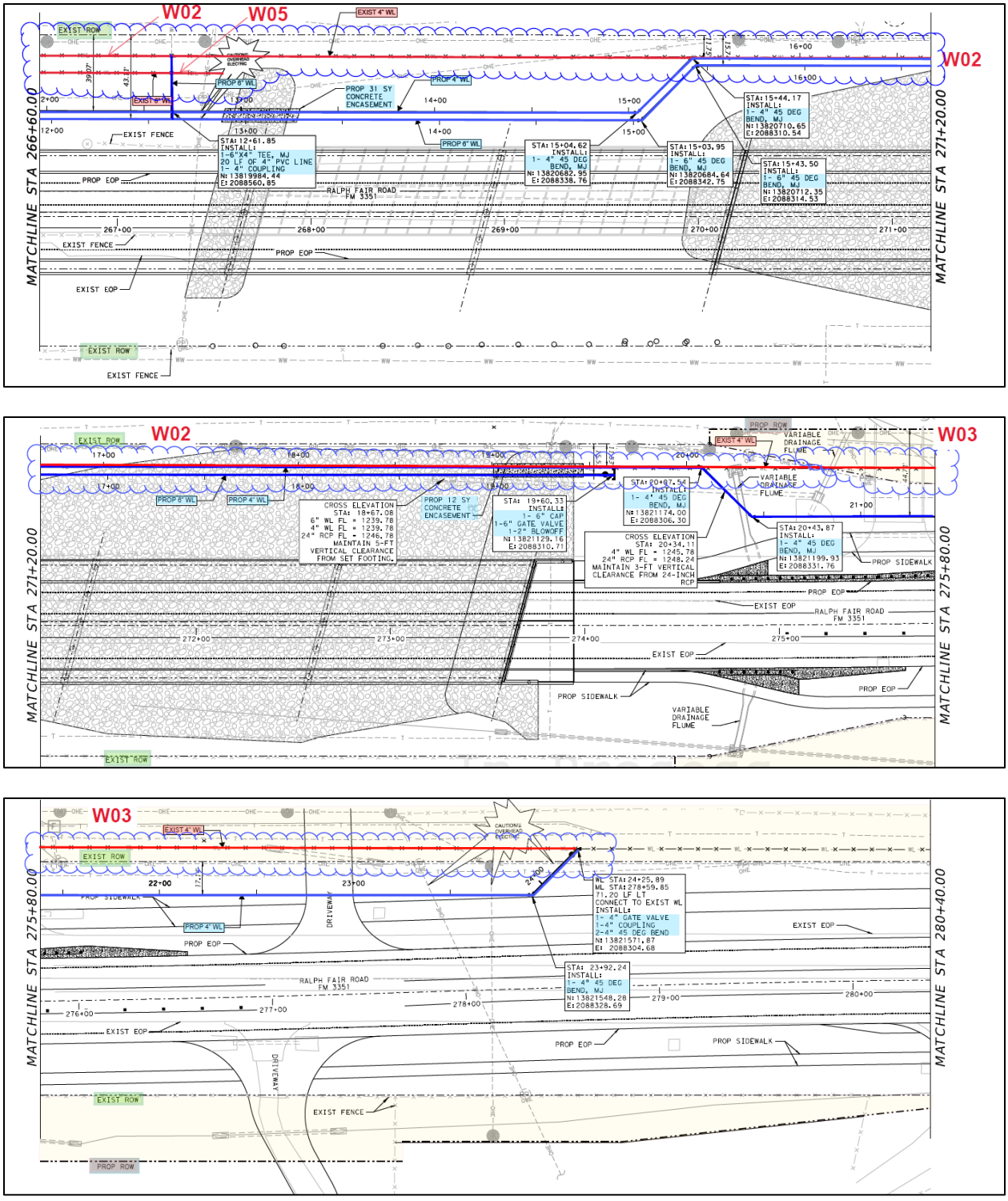


Figure 28. Case 14—Utility Relocation Plan (continued).

The city calculated an eligibility ratio by using the length method. As Figure 29 shows, TxDOT's participation was 60.95 percent. The total estimated utility relocation cost was $614,370.70. The agreement did not include elective betterments or salvage credit that could reduce the total cost. The eligible cost was 0.6095 × $614,370.70 = $374,458.94.

(TxDOTCONNECT shows the total estimated utility cost was $521,220.70, which was the estimated joint bid amount. TxDOTCONNECT also shows the eligible cost was 0.6095 × $521,220.70 = $317,684.02.)

The utility relocation was joint bid. According to the standard tabulation in Attachment A of the utility agreement, estimated joint bid costs were $521,220.70, utility costs were $93,150.00, and the amount due to TxDOT via an advance funding agreement was $203,536.68. The estimated net reimbursement to the utility owner was $56,774.93.

The standard utility agreement was fully executed on October 26, 2023. At that time, the city estimated a start date of April 2024 and an end date of August 2024, subject to physical work restrictions prior to the issuance of the environmental clearance. According to TxDOTCONNECT, the adjustment started on June 3, 2024 and ended on September 3, 2024.

	In Easement (Eligible) Existing LF	In Public ROW (Ineligible) Existing LF	Total
4-in (LF)	1253	1039	2292
6-in (LF)	865	318	1183
Total	2118	1357	3475
ELIG. %	**60.95%**	**39.05%**	100%

Figure 29. Case 14—Reimbursement Eligibility Calculation.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. It involved measuring the length of the 4-inch and 6-inch water lines, both inside the existing ROW (i.e., 2,118 ft) and in the private easements (i.e., 1,357 ft) for a total of 3,475 ft.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by dividing the utility relocation work into five segments according to whether the existing line was inside the existing ROW or in a private easement (Figure 28). The work included the relocation of 4,209 ft of water line (2,348 ft of 4-inch pipe and 1,861 ft of 6-inch pipe).

The utility agreement included disaggregated costs of materials in the form of quantities and unit costs for installed components. From the plans, the research team could extract pipe lengths by segment. However, the plans did not show the location of pipeline accessories, which made it necessary to make assumptions for distributing the corresponding costs to individual segments.

Table 35 summarizes the reimbursement eligibility calculation for each segment. The eligible cost was $128,405.40 for Segment W2, $142,099.03 for Segment W3, and

$134,156.40 for Segment W4. Segments W3 and W5 were not reimbursable. These cost estimates would provide the basis for reimbursement. The total eligible cost was $404,660.83, which was higher than the eligible cost included in the utility agreement (i.e., $374,458.94).

Table 35. Case 14—Alternative Reimbursement Eligibility Calculation.

Segment	Reimbursement Eligibility	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
W1	100%	$128,405.40	$128,405.40	$128,405.40	—
W2	100%	$142,099.03	$142,099.03	$142,099.03	—
W3	0%	$56,068.38	$56,068.38	—	$56,068.38
W4	100%	$134,156.40	$134,156.40	$134,156.40	—
W5	0%	$153,641.49	$153,641.49	—	$153,641.49
Total	—	**$614,370.70**	**$614,370.70**	**$404,660.83**	**$209,709.87**

Comparison of Methodologies

Table 36 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 36. Case 14—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It uses the same eligibility ratio across all segments, which can mask relocation differences between inside the existing ROW and private easement.
Separate calculations and reimbursement eligibility for each segment	It enables greater accuracy in distinguishing reimbursable and non-reimbursable work. It shows the actual impact of each segment by identifying which ones account for most of the reimbursable cost.	It relies on assumptions in situations in which the utility owner does not provide detailed plans showing the location of pipeline components. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 15—TYLER DISTRICT: US 175 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0198-03-026
ROW CSJ: 0198-03-031

The project involved adding lanes on US 175 from 0.4 mi southeast of SH 155 to the Cherokee County line at Neches River. The letting date was June 9, 2022. The low bid was $51,205,765.41. The project included the acquisition of ROW and several utility relocations, including electric, communications, gas, water, and wastewater.

Atmos Energy had one crossing that interfered with the project, involving a 6-inch gas pipeline crossing under the proposed roadway and ditch. The selected resolution was to fill approximately 650 ft of existing pipeline with flowable fill, abandon this facility in place, and install 615 ft of 6-inch pipeline, mostly by boring (Figure 30). The pipeline profile was determined by the amount of excavation needed for the highway. The minimum depth of cover was approximately 5 ft after TxDOT excavated the cross section for the highway construction project. This requirement also drove the need to extend the directional drilling operation outside the proposed ROW.

Atmos Energy calculated the eligibility ratio by using the length method. The length of the existing pipeline inside the ROW was 149.42 ft. The length of the existing pipeline in private easement up to the proposed ROW line was 247.52 ft. The total length was 396.94 ft. The eligibility ratio was 247.52 ÷ 396.94 = 62.36 percent. The eligibility calculation included the length of pipe inside the proposed ROW, but not any length outside the proposed ROW.

The total estimated utility relocation cost was $427,102.27. This amount included the work needed to make the pipeline functional again, including the installation of the pipeline outside the proposed ROW up to the tie-in points. The relocation did not have elective betterments or salvage credit that could reduce the total cost. As a result, the eligible cost was 0.6236 × $427,102.27 = $266,340.98.

The standard utility agreement was fully executed on November 4, 2021. At that time, Atmos Energy estimated a start date of October 25, 2021 and an end date of December 31, 2021.

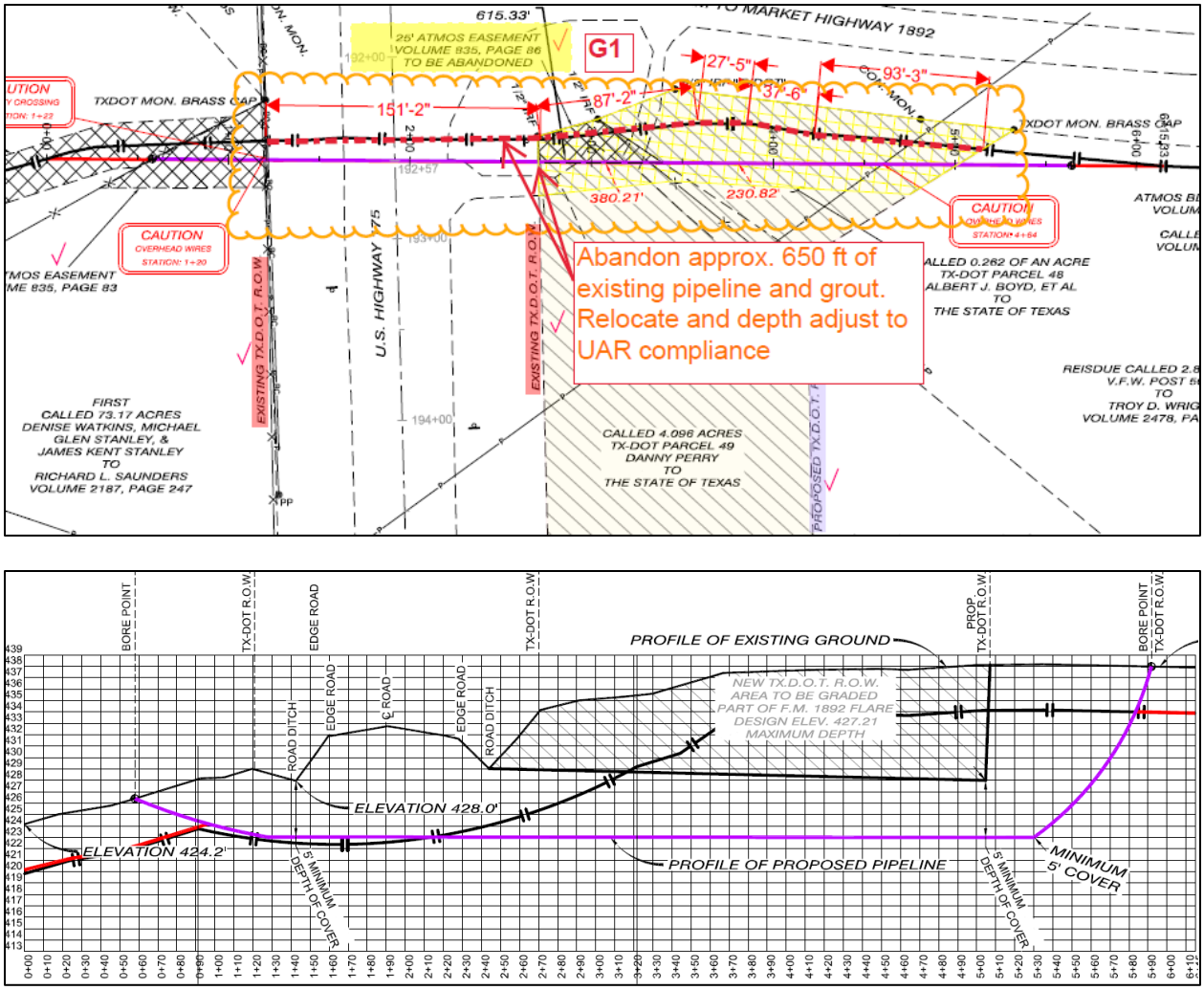


Figure 30. Case 15—Utility Relocation Plan and Profile.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. It involved measuring the length of the pipe inside the existing ROW excluding the area with prior rights (i.e., 149.42 ft) and the length of the pipe in existing private easement up to the proposed ROW line (i.e., 247.52 ft), for a total of 396.94 ft.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by explicitly considering the amount of utility relocation work outside the proposed ROW. The total length of 6-inch pipeline to be installed was 615 ft, of which approximately 218 ft were outside the proposed ROW. Assumptions the research team made for the calculation were as follows:

- The utility relocation work was uniform throughout the cross section, which means that prorating costs by length would be acceptable.

- The length of installation outside the proposed ROW was necessary (a) for the utility relocation work to facilitate tying the new installation to the existing pipeline and (b) to satisfy minimum depth of cover requirements after the significant amount of excavation needed for the highway construction.

Table 37 summarizes the reimbursement eligibility calculation. The eligible cost is $323,333.78, which is higher than the eligible cost included in the utility agreement (i.e., $266,340.98).

Table 37. Case 15—Alternative Reimbursement Eligibility Calculation.

Option	Length in Existing ROW (ft)	Length in Existing Easement (ft)	Length to Be Installed (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
—	149.42	247.52	615.00	—	—	—	—
Work inside existing ROW			149.42	$103,768.49	$103,768.49	—	$103,768.49
Work between existing ROW and proposed ROW			247.52	$171,896.51	$171,896.51	$171,896.51	—
Work outside proposed ROW			218.06	$151,437.27	$151,437.27	$151,437.27	—
			Total	$427,102.27	$427,102.27	$323,333.78	$103,768.49

Comparison of Methodologies

Table 38 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 38. Case 15—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It underestimates the amount of work outside the proposed ROW, which in this case was quite substantial and was justified by TxDOT depth requirement.
Separate calculations and reimbursement eligibility for each segment	It helps to ensure costs are assigned appropriately when work outside the proposed ROW is required to meet TxDOT requirements. It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing.	It requires disaggregated cost information by segment, which might not be provided by utility owners. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 16—TYLER DISTRICT: US 175 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0198-04-029
ROW CSJ: 0198-04-034

The project involved adding lanes on US 175 from 0.5 mi east of Anderson County Line and FM 347 in Jacksonville inside the city limits. The letting date was October 5, 2023. The standard utility agreement mentioned a letting date in June 2023, suggesting the district ended up postponing the letting date. The low bid was $167,154,897.17. The project included the acquisition of ROW and several utility relocations, including electric, communications, gas, water, and wastewater.

Atmos Energy had a 6-inch gas pipeline crossing that interfered with the project. According to the utility agreement, the existing pipeline did not satisfy Barlow's equation requirements for accommodation inside the public ROW. The selected resolution was to abandon the segment under the existing ROW, remove the segment of the existing pipe between the existing ROW line and the proposed ROW line, and install 700 ft of 8-inch steel pipe, of which approximately 395 ft were outside the proposed ROW (Figure 31). The construction method was directional boring.

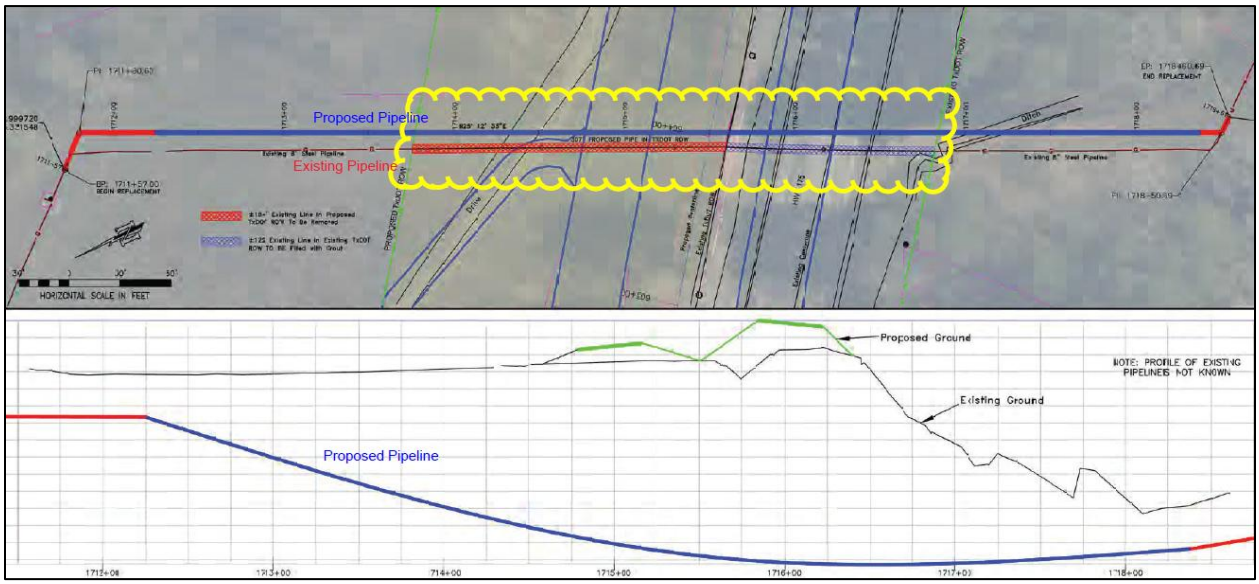


Figure 31. Case 16—Utility Relocation Plan and Profile.

The utility agreement did not include Barlow's equation for the existing pipeline nor for the proposed pipeline. In addition, the plans did not show the profile of the existing pipeline, so it was not possible to determine how deep it was prior to the construction or how deep it would have been with respect to the new highway cross section. The utility agreement did not include an analysis or justification for why it was necessary to have a depth of cover of approximately 25 ft under the highway. If the highway project required this depth of cover,

the 395 ft outside the proposed ROW would have been necessary. However, if the depth of cover requirement was lower, it might have been possible to shorten the proposed pipeline.

Atmos Energy calculated the reimbursement eligibility ratio by using the length method. As Figure 32 shows, TxDOT's participation was 59.67 percent. The reimbursement eligibility calculation included the length of pipe inside the proposed ROW, but not any length outside the proposed ROW. The total estimated utility relocation cost was $717,786.64. This amount includes the work needed to make the pipeline functional again, involving the installation of the pipeline outside the proposed ROW until the tie-in points. The resolution did not have elective betterments or salvage credit that could reduce the total cost. As a result, the eligible cost was 0.5967 × $717,786.64 = $428,303.29. Atmos Energy and TxDOT signed a JUA covering the area outside the existing ROW because Atmos Energy retained the easement.

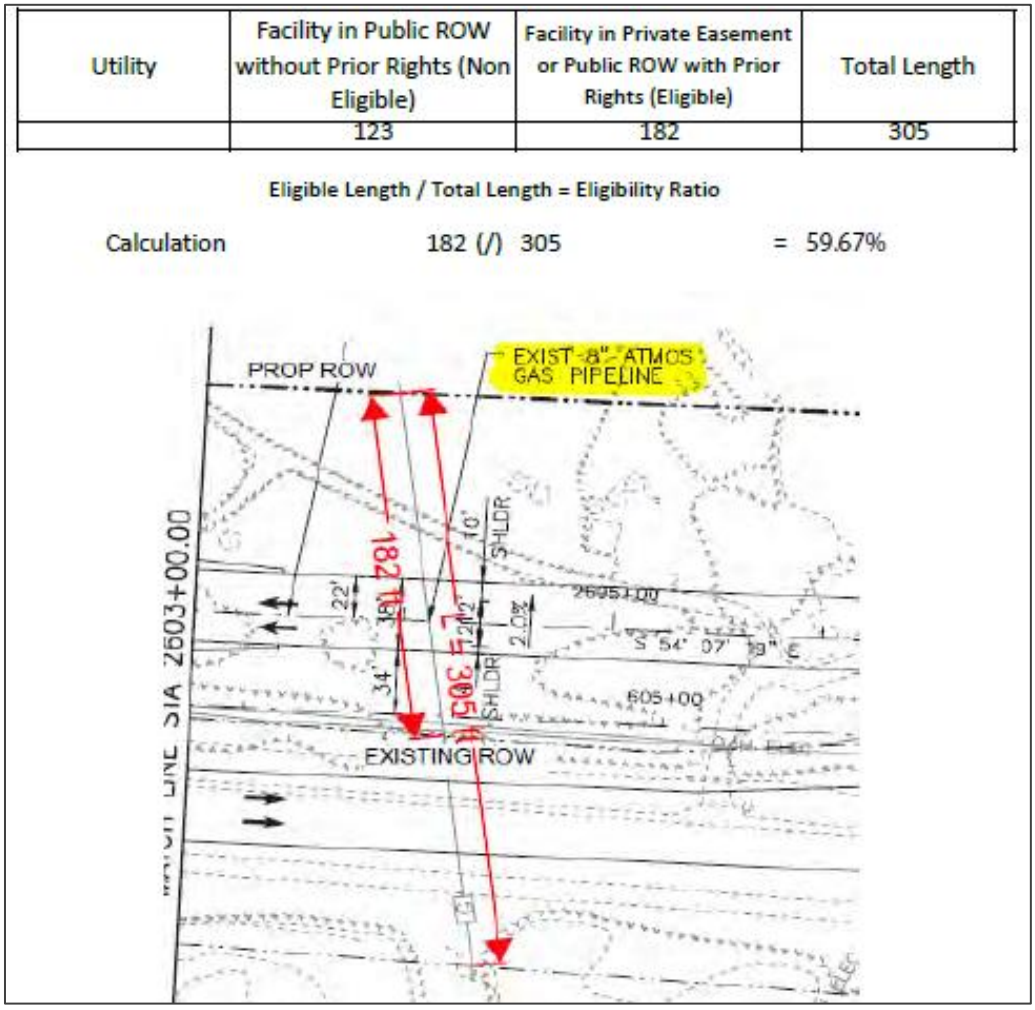


Figure 32. Case 16—Reimbursement Eligibility Calculation.

The standard utility agreement was fully executed on July 19, 2023. At that time, Atmos Energy estimated a start date of August 26, 2023 and an end date of October 11, 2023.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. It involved measuring the length of the pipe inside the existing ROW excluding the area with prior rights (i.e., 123 ft) and the length of the pipe in existing private easement up to the proposed ROW line (i.e., 182 ft), for a total of 305 ft. As mentioned, the plans did not show essential information, such as profile of the existing pipeline. Including this information would have made the review process easier.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by assuming the utility relocation work could have been contained inside the proposed ROW (except for short sections just outside the proposed ROW for the tie-in connections). As mentioned, the utility agreement did not explain why it was necessary for the depth of cover to be approximately 25 ft under the highway. If the pipeline could have been shallower, it might have been possible to shorten the proposed pipeline.

Table 39 summarizes the reimbursement eligibility calculation. The eligible cost is $325,081.81, which is lower than the eligible cost included in the utility agreement (i.e., $428,303.29).

Table 39. Case 16—Alternative Reimbursement Eligibility Calculation.

Option	Total Existing Length (ft)	Existing Length in Easement (ft)	Length to Be Installed (ft)	Utility Relocation Cost	Cost Without Betterment	Eligible Cost	Non-Eligible Cost
—	305	182	305	—	—	—	—
Work inside existing ROW			123	$219,717.60	$219,717.60	—	$219,717.60
Work between existing ROW and proposed ROW			182	$325,081.81	$325,081.81	$325,081.81	—
			Total	**$544,799.41**	**$544,799.41**	**$325,081.81**	**$219,717.60**

Comparison of Methodologies

Table 40 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 40. Case 16—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It does not easily account for work inside the proposed ROW versus work outside the proposed ROW, which makes the evaluation of the need for work outside the proposed ROW more difficult.
Separate calculations and reimbursement eligibility for each segment	It enables greater accuracy in distinguishing reimbursable and non-reimbursable work. It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing.	It relies on assumptions (e.g., relocation could have been contained inside proposed ROW) when agreements do not provide sufficient information or justification. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 17—YOAKUM DISTRICT: US 59 RURAL FREEWAY UPGRADE PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0089-07-154; Project CSJ: 0089-08-100
ROW CSJ: 0089-08-104

The project involved upgrading US 59 to a rural freeway (future IH 69 corridor) from SH 60 to FM 102 inside the City of Wharton. The letting date was December 5, 2023. The low bid was $103,634,660.27. The project included ROW acquisition and several utility relocations, including electric, gas, water, wastewater, and communications.

The City of Wharton had a waterline that interfered with the project because of the additional ROW that was necessary for the US 59 freeway upgrade (Figure 33). The waterline ran longitudinally, including segments inside the existing ROW and segments inside an existing easement. The selected resolution involved relocating 11,541 ft of waterline, including 10,060 ft of 16-inch waterline and 1,481 ft of 12-inch waterline, most of it to a replacement easement. The City of Wharton upgraded the 12-inch waterline to 16 inches.

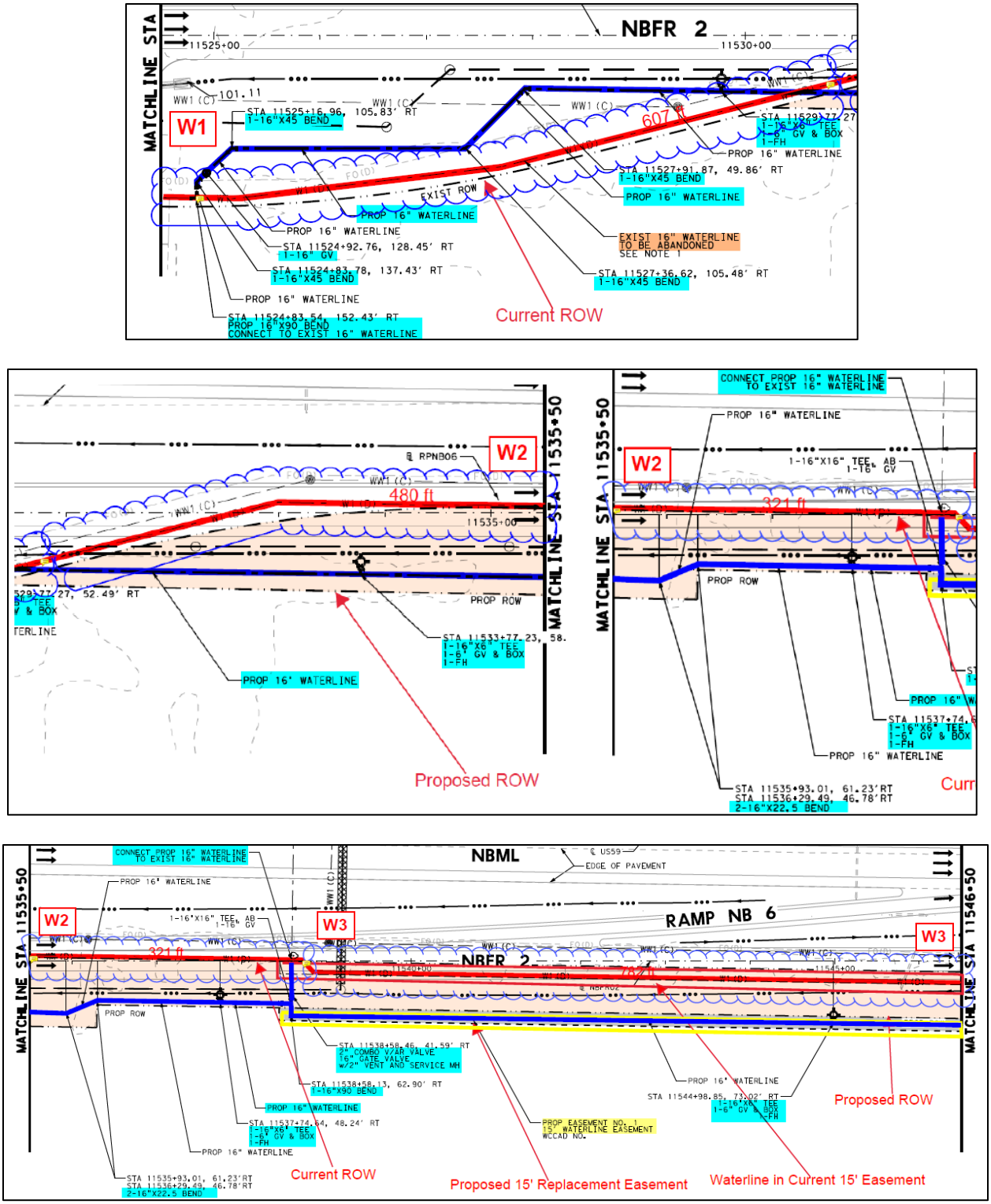


Figure 33. Case 17—Utility Relocation Plan.

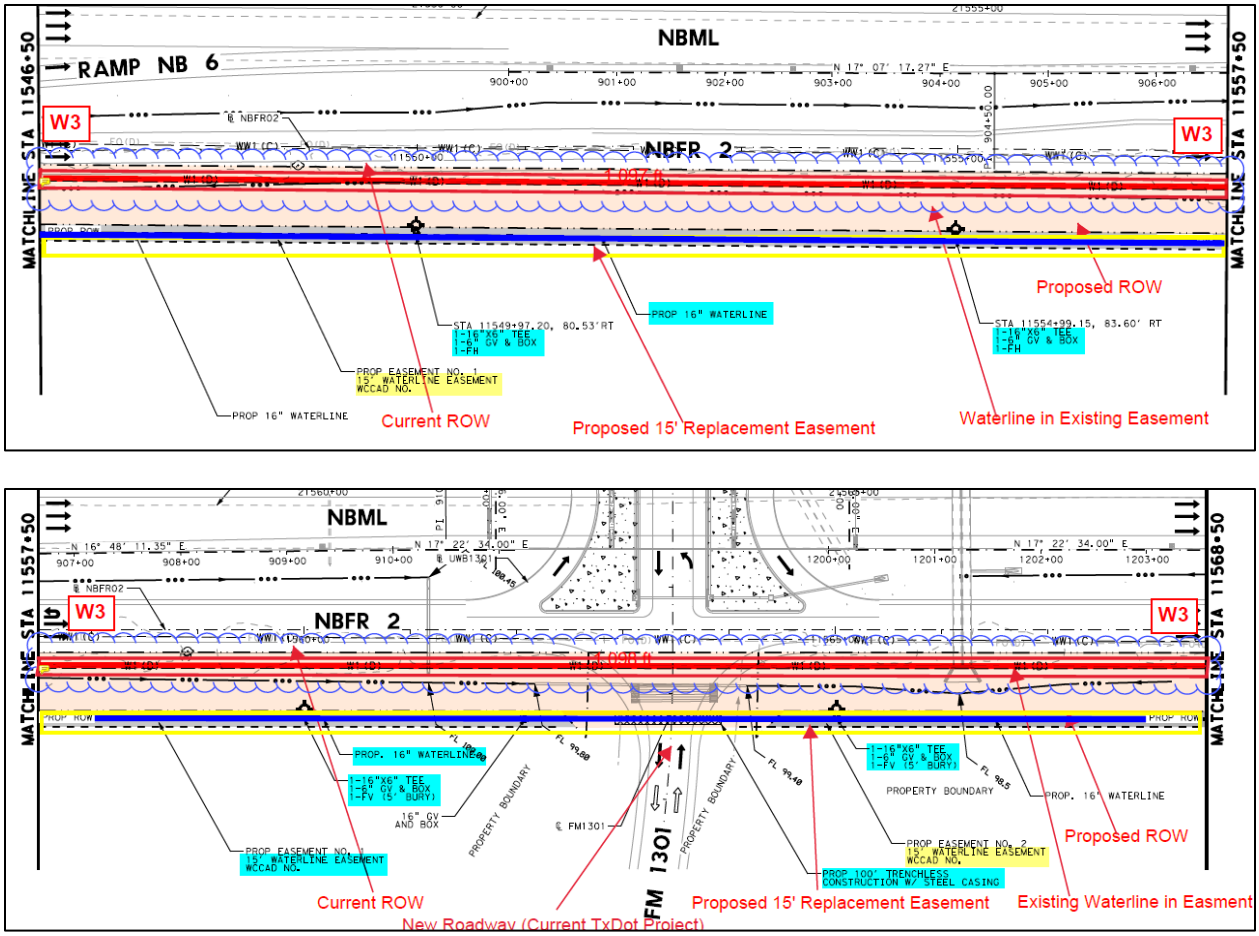


Figure 33. Case 17—Utility Relocation Plan (continued).

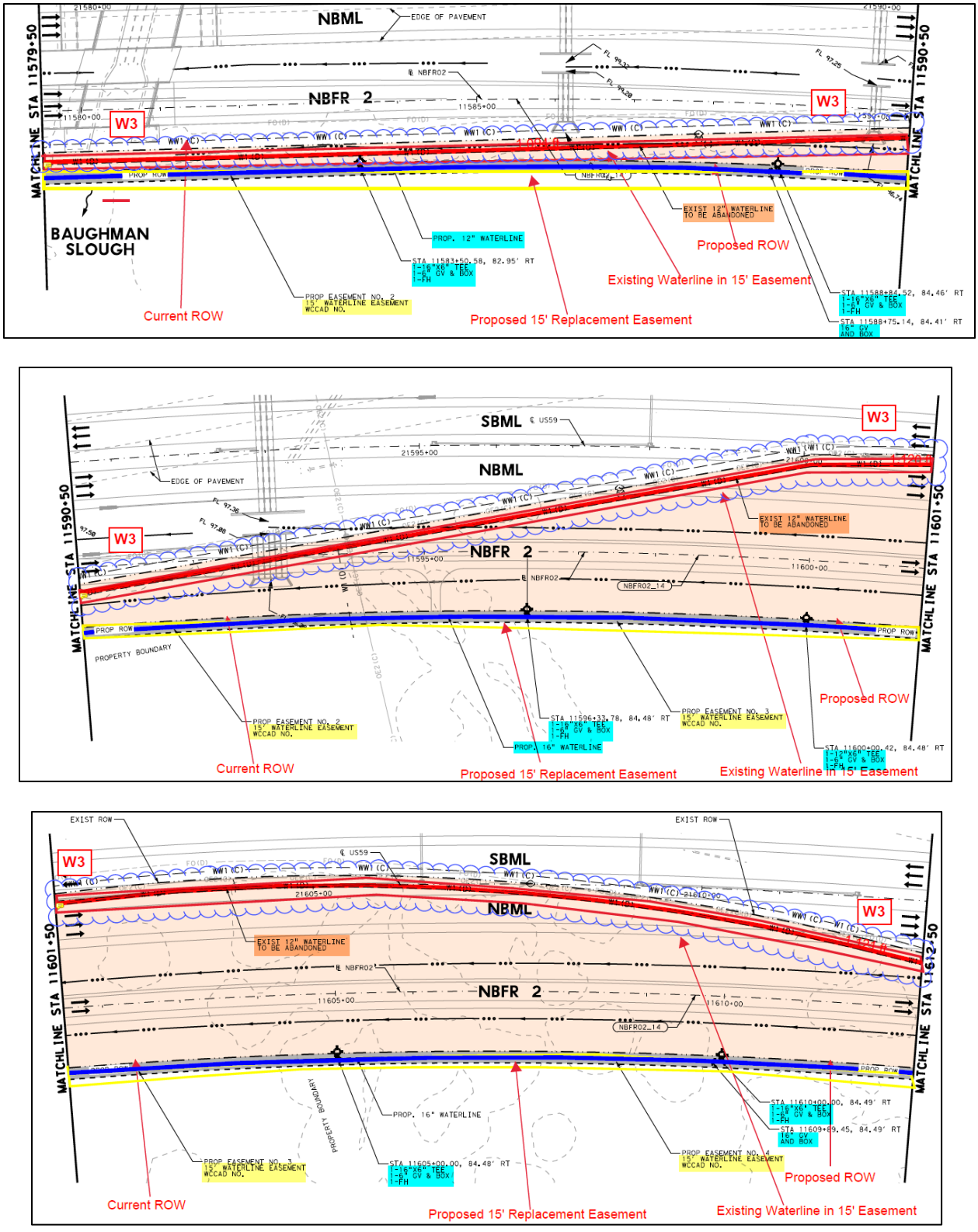


Figure 33. Case 17—Utility Relocation Plan (continued).

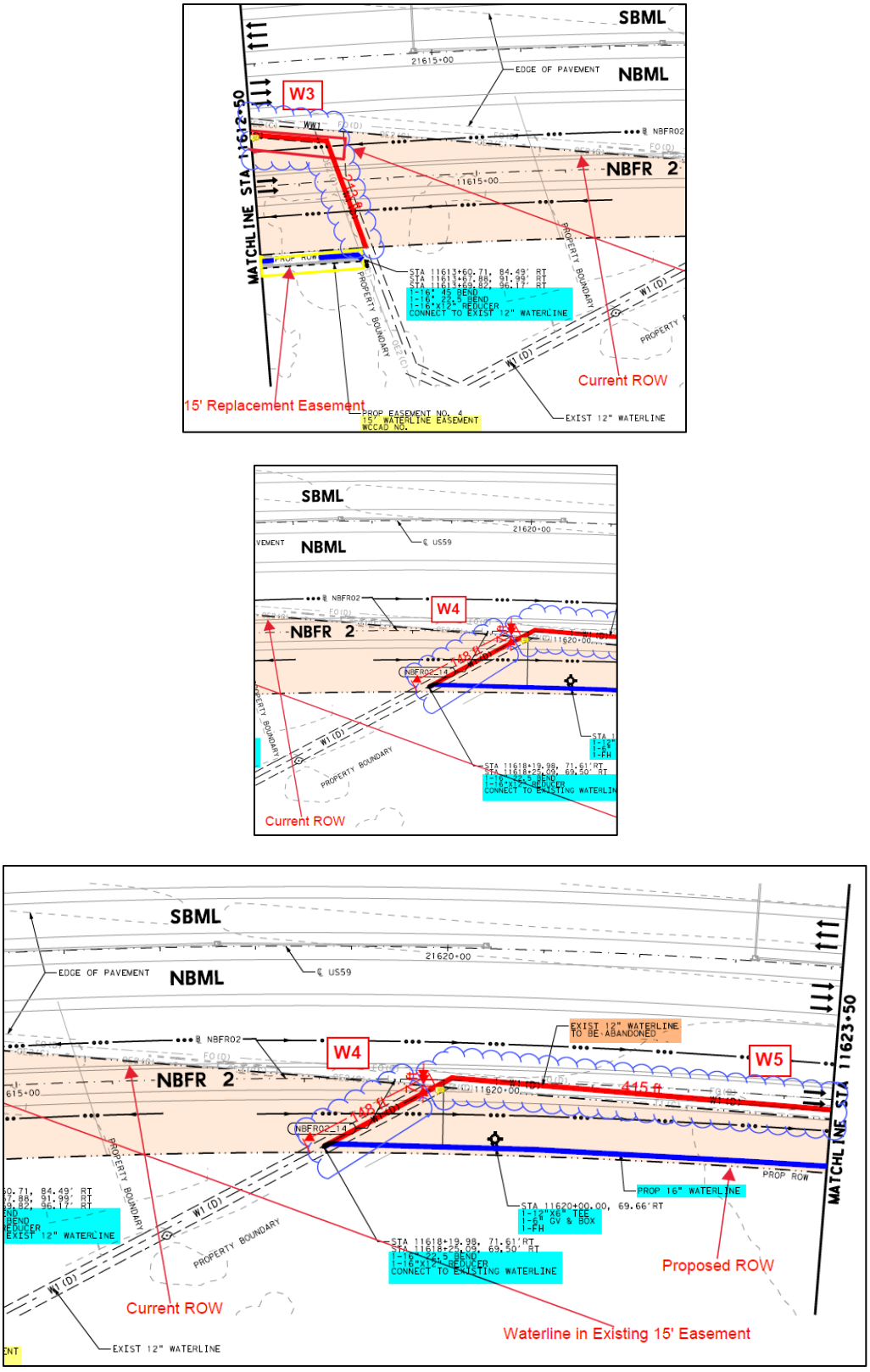


Figure 33. Case 17—Utility Relocation Plan (continued).

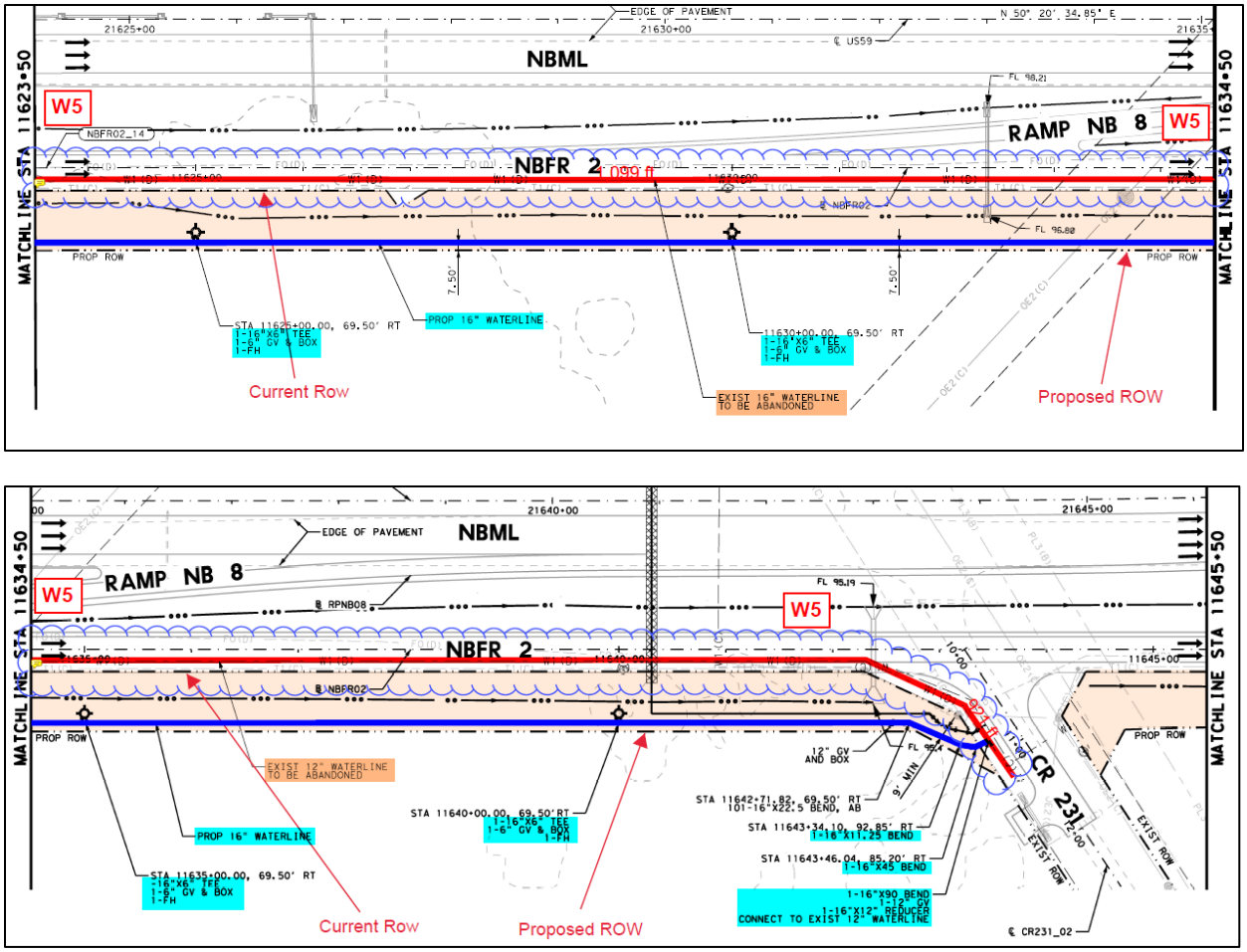


Figure 33. Case 17—Utility Relocation Plan (continued).

The City of Wharton calculated the reimbursement eligibility ratio using the length method for each of the 11 sheets included in the standard utility agreement. As Figure 34 shows, TxDOT's participation was 65.30 percent.

The total estimated utility relocation cost was $1,794,839.13. A total of 1,481 ft of waterline corresponds to an elective betterment from 12 inches to 16 inches, resulting in a betterment of 10.72 percent (Figure 35). The subtotal accounting for the elective betterment was (1 – 0.1072) × $1,794,839.13 = $1,602,432.38. The agreement did not include salvage credit that could reduce the total cost. The eligible cost was 0.6530 × $1,602,432.38 = $1,046,388.34. The standard utility agreement included a detailed tabulation of the cost of materials, labor, and other categories for the entire utility relocation but did not single out the total cost associated with each sheet.

Plan Sheet or Page#	In Easement (Eligible) Existing LF	In Public ROW (Ineligible) Existing LF
28	0	1115
29	804	366
30	1100	
31	1100	
32	1100	
33	1100	
34	1100	
35	1100	
36	132	523
37	0	1100
38	0	901
Totals	7536	4005
Total Existing LF (Eligible)		7536
Total Existing LF (Ineligible)		4005
Total Existing LF		11541
Total Existing LF (Eligible) divided by the Total Existing LF		65.30%

Figure 34. Case 17—Reimbursement Eligibility Calculation.

Elective betterment justification statement:
The City of Wharton has elected to install a 16-inch waterline in place of the existing 12-inch water line from STA 11538+58 to STA 11643+47 to accommodate new infrastructure and future development in the area along US 59.

Betterment Ratio:
Construction Cost for 11,541 ft. of 16" Waterline $1,794,839.13
Construction Cost for 1,481 ft. of 12" & 10,060 ft. of 16" Waterline $1,602,403.88
Betterment Value (Upgrading 1481' of 12" to 16" Waterline) $192,435.25

$$\%\ \text{Betterment} = \frac{\text{Cost for 16" Waterline - Cost for 12" Waterline}}{\text{Cost for 12" Waterline}}$$

$$\%\ \text{Betterment} = \frac{\$1,794,839 - \$1,602,432}{\$1,794,839}$$

$$\%\ \text{Betterment} = 10.72\%$$

Figure 35. Case 17—Elective Betterment Calculation.

The utility agreement included $75,011.97 for replacement easement costs, which were eligible for 100 percent reimbursement per exception to policy executed in December 2022. The current policy at TxDOT is to include replacement easement costs in the eligibility calculation. In this case, the exception to policy was to reimburse the replacement easement cost at 100 percent. The total state participation was $1,046,388.34 + $75,011.97 = $1,121,400.31.

The standard utility agreement was fully executed on January 25, 2023. At that time, the City of Wharton estimated a start date of March 1, 2023 and an end date of October 9, 2023.

Length Method Improvement

The reimbursement eligibility calculation for this utility agreement was straightforward. It involved measuring the length of the 12-inch and 16-inch water lines, both inside the existing ROW (i.e., 4,005 ft) and in the private easements (7,536 ft), for a total of 11,541 ft.

Alternative Reimbursement Eligibility Calculation

The research team calculated an alternative eligible cost by dividing the utility relocation work into 5 segments, as shown in Figure 33. The main criterion for selecting the limit of each segment was whether the existing pipe was inside the existing ROW (in which case the reimbursement eligibility was zero) or in a private easement (in which case the reimbursement eligibility was 100 percent).

The work included the relocation of 11,541 ft of water line (10,060 ft of 16-inch pipe and 1,481 ft of 12-inch pipe). The 12-inch water line was to be upgraded to 16-inch, resulting in a 10.72 percent betterment. All the work took place inside the proposed ROW (i.e., it was not necessary to conduct any relocation work outside the proposed ROW).

The utility owner provided a relocation cost disaggregated by activity using quantities and unit costs. However, the plans did not show the location of each pipeline accessory, which made it necessary to make some assumptions to allocate the corresponding costs. As mentioned, the replacement easement cost of $75,011.97 was 100 percent reimbursable per exception to policy. The research team allocated this cost to segments W3 and W4 as a proportion of the corresponding costs without betterment.

Table 41 summarizes the reimbursement eligibility calculation for each segment. These cost estimates would provide the basis for reimbursement. The eligible cost minus replacement easement costs is $1,144,886.17 – $75,011.97 = $1,069,874.20. This amount is slightly higher than the eligible cost calculated using the length method (i.e., $1,046,388.34).

Table 41. Case 17—Alternative Reimbursement Eligibility Calculation.

Segment	Reimbursement Eligibility	Utility Relocation Cost	Cost Without Betterment	Replacement Easement Cost	Eligible Cost	Non-Eligible Cost
W1	0%	$99,739.73	$99,047.63	—	—	$99,047.63
W2	0%	$130,156.43	$116,203.66	—	—	$116,203.66
W3	100%	$1,170,667.04	$1,045,171.54	$73,280.00	$1,118,451.53	—
W4	100%	$27,668.75	$27,702.66	$1731.97	$26,434.63	—
W5	0%	$366,607.17	$327,306.89	—	—	$327,306.89
Total	—	**$1,794,839.13**	**$1,602,432.38**	**$75,011.97**	**$1,144,886.17**	**$532,558.18**

Comparison of Methodologies

Table 42 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 42. Case 17—Methodology Comparison.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	Different reimbursement eligibility conditions across segments are lumped into one eligibility ratio, even if only some segments are affected (e.g., upgrades or betterments), masking differences in cost distribution across segments.
Separate calculations and reimbursement eligibility for each segment	It provides clear identification of costs tied to betterments (e.g., upsizing from 12-inch to 16-inch waterline). It shows the actual impact of each segment on costs by identifying which segments account for most of the reimbursable cost. It facilitates a clearer understanding of actual cost distributions by segment, which can help during review or auditing.	It requires disaggregated cost information by segment, which might not be provided by utility owners. The additional effort of providing disaggregated cost data was not justified in this case because the reimbursable cost was like the result obtained using the length method. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT.

CASE 18—YOAKUM DISTRICT: US 77 WIDENING PROJECT

Reimbursement Eligibility Calculation in Utility Agreement

CCSJ: 0211-06-059
ROW CSJ: 0211-06-066

The project involved widening US 77 as a non-freeway from the Lee County Line to SH 71 in Fayette County. The letting date was January 4, 2024. The low bid was $99,476,995.76. The project included ROW acquisition and several utility relocations, including electric, gas, water, wastewater, and communications.

ETC Texas Pipeline had 8 crossings that interfered with the project: 6 90-degree crossings and 2 skewed crossings (Figure 36). The selected resolution for the 90-degree crossings was to extend the existing encasement from the existing ROW to the proposed ROW line. The work did not include activities outside the proposed ROW, except for short extensions of the casing and proposed vents. Each of the 2 skewed crossings included a 90-degree crossing inside the existing ROW and 2 skewed segments inside the additional ROW, making the crossing skewed. For the skewed crossings, the selected resolution was to abandon in place the segment located under the existing ROW, remove the segment inside

the proposed ROW, and install a new crossing at 90 degrees. For 1 of the locations, the installation included boring with a depth of cover of 27 ft under the highway.

The utility relocation work was 100 percent reimbursable (except at 2 locations). ETC Texas Pipeline used a CER based on separate calculations for each of the eight crossings (Table 43). TxDOT's participation was 82.15 percent. The total utility relocation cost was $5,938,966.55. The total eligible cost was $4,878,913.99. (According to TxDOTCONNECT, the eligible cost was 0.8215 × $5,938,966.52 = $4,878,861.00. The utility agreement did not mention this amount, although it did show that the basis for the eligibility ratio calculation was $4,878,913.96).

The total utility relocation cost of $5,938,966.55 included the work needed to make the pipeline functional again, involving the installation of the pipeline outside the proposed ROW up to the tie-in points. None of the relocations had elective betterments or salvage credit that could reduce the total cost. The existing lengths mentioned above were measured along a straight line associated with the segment of pipeline inside the existing ROW (which was perpendicular to the roadway alignment), not actual pipeline lengths.

The standard utility agreement was fully executed on August 31, 2023. At that time, the utility owner estimated a start date of December 4, 2023 and an end date of February 29, 2024.

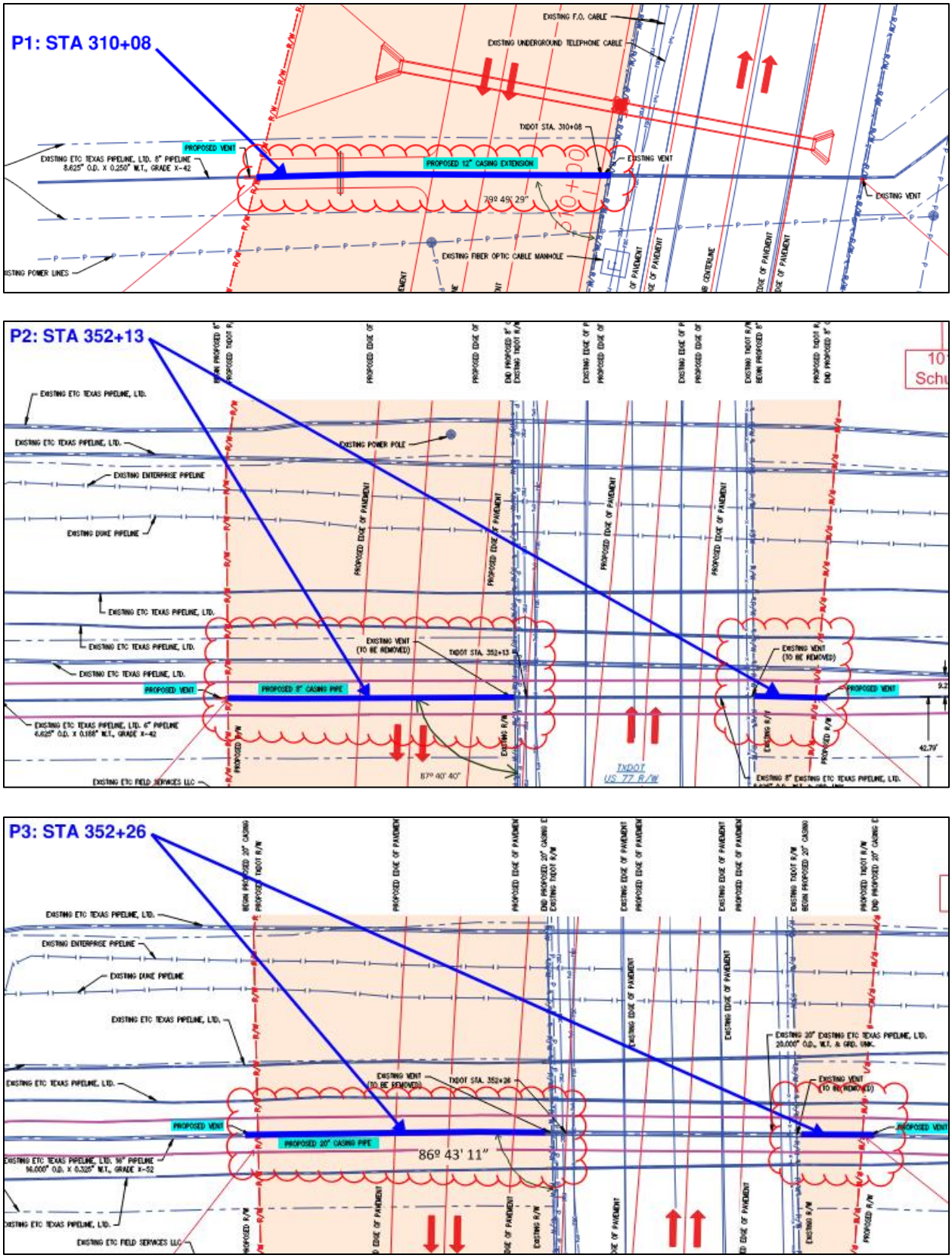
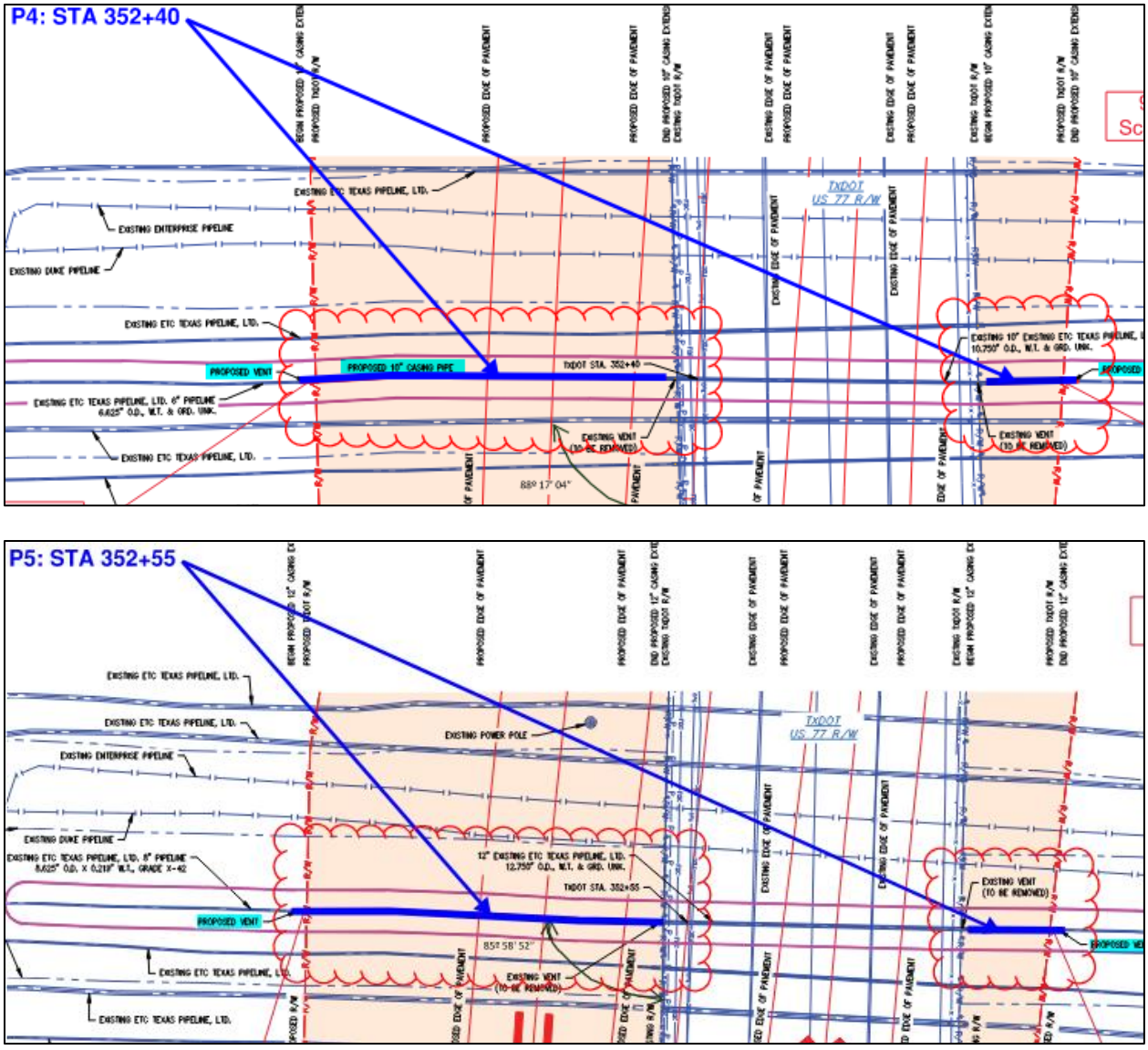


Figure 36. Case 18—Utility Relocation Plan.



P6: STA 353+05. The standard utility agreement did not include plans for the isolation structure consisting of a 14-ft-wide concrete slab and 36 piers. Each pier was 24 inches in diameter and 20 ft in length.

Figure 36. Case 18—Utility Relocation Plan (continued).

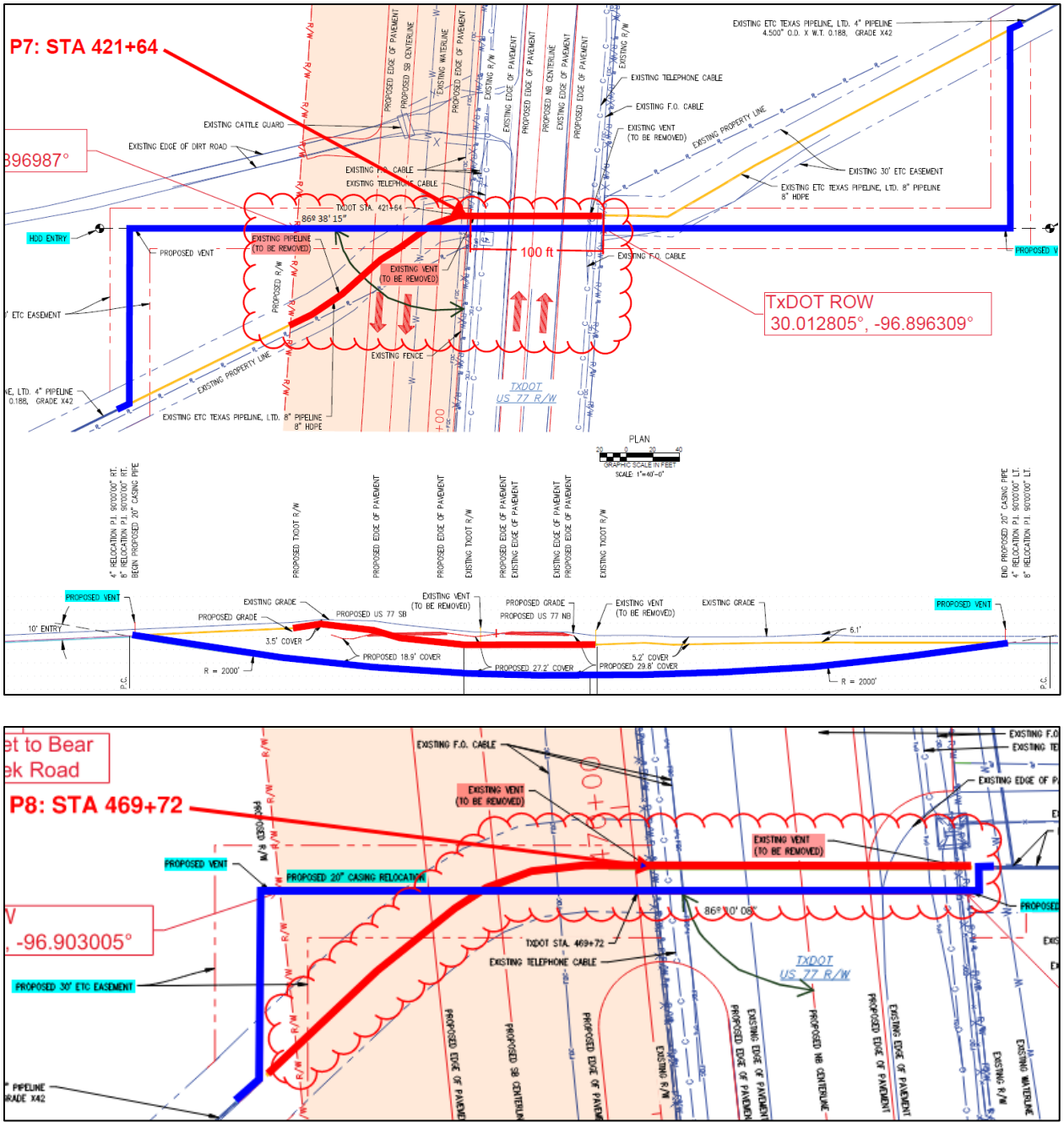


Figure 36. Case 18—Utility Relocation Plan (continued).

Table 43. Case 18—Reimbursement Eligibility Calculation.

Location	Description	Length in Existing Public ROW (ft)	Length in Existing Easement (ft)	Total Existing Length (ft)	Eligibility Ratio	Utility Relocation Cost	Eligible Cost
P1	Sta 310+25—8" Hobratschk Rainosek Line (19920042)	0	142	142	100.00%	$466,921.90	$466,921.90
P2	Sta 352+10—6" Plant to Plant Line (19800237)	0	120	120	100.00%	$496,275.42	$496,275.42
P3	Sta 352+25—16" La Grange Plant to Perry Line (19800239)	0	120	120	100.00%	$531,180.22	$531,180.22
P4	Sta 352+40—6" Mainline A265 Line (19800234)	0	120	120	100.00%	$457,242.58	$457,242.58
P5	Sta 352+75—8" Winchester Pipeline (19800238)	0	122	122	100.00%	$475,229.50	$475,229.50
P6	Sta 353+05—20" Chisholm Pipeline (20101107)	0	120	120	100.00%	$1,117,348.83	$1,117,348.83
P7	Sta 422+65—8" Mahimmann Walter No. 1 Line (19920062)	102	131	233	56.22%	$1,472,283.18	$827,764.36
P8	Sta 469+50—6" Walthers Keck No. 1 Line (19920153)	100	122	222	54.95%	$922,484.92	$506,951.17
Total		**202**	**997**	**1,199**	—	**$5,938,966.55**	**$4,878,913.99**
Composite Eligibility Ratio							**82.15%**

CER Method Improvement

As mentioned, the reimbursement eligibility calculation for this utility agreement was based on a method that included eligibility ratio calculations for individual locations (based on length) and a CER based on the sum of eligible costs for all eight locations. The calculation included total costs outside the proposed ROW. For locations P1 through P6, this consideration did not matter because all the work was inside the proposed ROW. However, it did matter for locations P7 and P8 because the amount of work outside the proposed ROW was significant.

As mentioned, lengths for reimbursement eligibility calculations were measured along a straight line associated with the segment of pipeline inside the existing ROW (which was perpendicular to the roadway alignment), not actual pipeline lengths. If actual existing pipeline lengths had been used, the eligibility ratio for locations P7 and P8 would have been higher. The eligible pipeline length for location P7 would have been 160 ft (instead of 131 ft). The corresponding eligibility ratio would have been 160 ÷ (102 + 160) = 160 ÷ 262 = 61.07 percent. For location P8, the eligible length would have been 135 ft (instead of 122 ft). The corresponding eligibility ratio would have been 135 ÷ (100 + 135) = 135 ÷ 235 = 57.45 percent. The CER would have been 83.74 percent, and the eligible cost would have been 0.8374 × $5,938,966.55 = $4,973,290.59.

Alternative Reimbursement Eligibility Calculation

The research team attempted to disaggregate costs to explicitly account for work outside the proposed ROW for individual locations (explicitly P7 and P8). The cost estimate in the utility agreement disaggregated materials for individual locations (except P6), but in other categories such as contractor, surveying, and inspection costs, the cost estimate was aggregated for each location. For location P6, the cost of materials did not include concrete, rock material, or rebar, even though these elements were necessary for the construction of a large isolation structure consisting of a 14-ft-wide concrete slab supported by 36 piers. Each pier was 24 inches in diameter and 20 ft in length. Instead, these cost elements were included in the lump sum prime contractor cost estimate.

As a result, it was not possible to make reasonable assumptions as to the distribution of contractor, surveying, and inspection costs among individual locations, which also meant that it was not possible to reliably separate costs inside the proposed ROW and costs outside the proposed ROW. In the absence of this critical information, the only feasible option was to provide a revised cost estimate using eligibility ratios based on length for individual locations.

Table 44 shows the utility relocation and the eligible cost for each location. These cost estimates would provide the basis for reimbursement. In Table 44, the basis for reimbursement eligibility for location P7 was the length of existing pipe up to the proposed ROW (i.e., 262 ft). However, the total length of the installation was 968 ft (including 661 ft via boring), raising the question whether part or all this length should have been included in the reimbursement eligibility calculation. The plans showed the boring deflection and radius that resulted in this length based on a proposed 27-ft depth of cover under the road. However, the plans did not explain why this depth of cover was necessary or whether a shorter boring length would have been possible. In the absence of this information, it was not possible to ascertain whether all the work outside the proposed ROW should have been included in the reimbursement eligibility calculation. Nevertheless, as a reference, Table 44 shows the result of the calculation assuming that all work outside the proposed ROW was included.

Table 44. Case 18—Alternative Reimbursement Eligibility Calculation.

Location	Description	Length in Existing Public ROW (ft)	Length in Existing Easement (ft)	Total Existing Length (ft)	Eligibility Ratio	Utility Relocation Cost	Eligible Cost
P1	Sta 310+25—8" Hobratschk Rainosek Line (19920042)	0	142	142	100.00%	$466,921.90	$466,921.90
P2	Sta 352+10—6" Plant to Plant Line (19800237)	0	120	120	100.00%	$496,275.42	$496,275.42
P3	Sta 352+25—16" La Grange Plant to Perry Line (19800239)	0	120	120	100.00%	$531,180.22	$531,180.22
P4	Sta 352+40—6" Mainline A265 Line (19800234)	0	120	120	100.00%	$457,242.58	$457,242.58
P5	Sta 352+75—8" Winchester Pipeline (19800238)	0	122	122	100.00%	$475,229.50	$475,229.50
P6	Sta 353+05—20" Chisholm Pipeline (20101107)	0	120	120	100.00%	$1,117,348.83	$1,117,348.83
P7	Sta 422+65—8" Mahimmann Walter No. 1 Line (19920062)	102	866	968	89.46%	$1,472,283.18	$1,317,145.90
P8	Sta 469+50—6" Walthers Keck No. 1 Line (19920153)	100	135	235	57.45%	$922,484.92	$529,938.15
Total		**202**	**1,745**	**1,947**	—	**$5,938,966.55**	**$5,391,282.50**

Comparison of Methodologies

Table 45 lists advantages and disadvantages associated with the two reimbursement eligibility calculation methodologies.

Table 45. Case 18—Methodology Comparison.

Methodology	Advantages	Disadvantages
CER method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	Mixing segments with quite different reimbursement eligibility levels hides specific reimbursement conditions that affect individual crossings.
Separate calculations and reimbursement eligibility for each segment	It manages each location separately, allowing reimbursement eligibility to be adapted to the conditions of individual crossings. It enables greater accuracy in distinguishing reimbursable and non-reimbursable work. It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing.	It requires disaggregated cost information by segment, which might not be provided by utility owners. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT. Currently, to account for each location separately, it would be necessary to execute separate utility agreements.

GENERAL TRENDS

The research team reviewed a sample of 18 utility agreements to identify potential ways to improve the reimbursement eligibility calculations that TxDOT has used for decades. The analysis included the length method, the pole count method, and the CER method. For each of the agreements, the research team also analyzed alternative reimbursement eligibility calculations. Table 46 includes a summary of observations for all 18 utility agreements.

Table 46. Advantages and Disadvantages for All Methodologies.

Methodology	Advantages	Disadvantages
Length method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	It ignores differences in reimbursement eligibility for each segment as well as variations in cost per segment that might occur during construction. It relies on clear plans to identify all installation component locations details. It is sensitive to the quality and completeness of the information included in the utility agreement. It underestimates the amount of work outside the proposed ROW, which can be substantial and is often justified for meeting TxDOT depth requirements.
Pole method	It is easy to understand and apply in most cases.	It is problematic in situations in which the plans do not clearly show the type of property interest that is associated with each individual pole. It is sensitive to the number of poles. As the number of poles decreases, the risk of overestimating or underestimating reimbursement eligibility levels increases.
CER method	It is straightforward and simple to calculate. The same eligibility ratio is used for partial and final payments.	Mixing segments with quite different reimbursement eligibility levels hides specific reimbursement conditions that affect individual crossings. It also masks quality-control issues if cost elements are missing. It is sensitive to the same issues that affect the length or pole count method used to calculate the eligibility ratio for individual segments or components.
Separate calculations and reimbursement eligibility for each segment	It manages each location separately, allowing reimbursement eligibility to be adapted to the conditions of individual crossings. It enables greater accuracy in distinguishing reimbursable and non-reimbursable work. It facilitates a clearer understanding of actual cost distribution by segment, which can help during review or auditing. It ensures that reimbursement is based on realistic construction sequencing, aligning the calculation with how the work would be performed.	It requires disaggregated cost information by segment, which might not be provided by utility owners. It is sensitive to the criteria used to divide segments. Dividing segments by reimbursement eligibility overlooks differences in the field with respect to construction methods or phasing. Grouping segments by construction method or phasing is more effective. Implementation would require changes to business practices, manuals, and systems, including TxDOTCONNECT. Currently, to account for each location separately, it would be necessary to execute separate utility agreements.

Reimbursement eligibility calculations based on length were straightforward. However, the length method was sensitive to the quality and completeness of the information included in the utility agreement. Several utility agreements the research team analyzed had errors. These errors were often measurement errors, linked to quality issues affecting the plans the utility owner was using. The research team also encountered issues in situations in which the plans did not clearly show the existing or proposed ROW lines.

Reimbursement eligibility calculations based on pole counts were straightforward. However, the pole count method was sensitive to the number of poles in the calculation, particularly in situations in which the number of poles was low. In general, as the number of poles involved decreased or facility variability along the line increased, the risk of overestimating or underestimating reimbursement eligibility increased. The calculations also relied on the assumption that utility lines (including pole accessories) were uniform and homogeneous. Utility relocations that involve just a few poles are particularly problematic. For example, in situations that involve 2 poles, the reimbursement eligibility could be 0, 50 percent, or 100 percent, depending on the pole locations with respect to the existing ROW line. In situations that involve only 1 pole, the reimbursement eligibility could be 0 or 100 percent.

CER calculations were conceptually simple to understand, but more difficult to use. Because the CER method used eligibility ratios for individual components which were then aggregated into a CER, the CER method was sensitive to the same issues affecting the length and pole count methods. In addition, CER calculations were sensitive to significant differences in eligibility levels among segments or locations. Disproportionate weighting causes a bias in the result, raising the question whether the CER method is always an equitable indicator of reimbursement eligibility for the entire utility agreement. Furthermore, the research team found cases in which the actual CER calculation had errors, confirming difficulties users often encounter understanding and using the CER method.

Elective betterments increased the level of complexity in the calculations. A trend the research team noticed was that the elective betterment percentage applied to the entire relocation cost, even though the betterment was associated with one component of the entire utility relocation. In addition, supplemental agreements with changes in the estimate relocation cost did not include disaggregated cost data for betterments, making it difficult to ascertain the impact of the betterment on the corresponding relocation component.

The research team evaluated three main types of alternative methodologies:

- Dividing segments according to reimbursement eligibility: The main criterion for dividing segments is whether the utility segment has a property interest or a prior right. If the answer is yes, the relocation for that segment is 100 percent reimbursable. Otherwise, the relocation is not reimbursable. In most cases, the application of the criterion involves determining whether a segment is inside the

existing ROW under the assumption the segment occupies the existing ROW by permit. However, this is not always the case. This methodology is conceptually simple. If the utility owner provides disaggregated data by segment, it is also easy to apply. However, it becomes increasingly difficult to use whenever the construction method or phasing spans multiple segments, which is often the case with longitudinal installations.

- Dividing segments by construction method or phasing: The main criterion for dividing segments is the type of construction method or phasing used. For example, a linear installation that includes underground and aerial segments often involves different construction methods, which can have drastically different cost structures. Understanding these differences is key, especially in situations in which the various segments also have different reimbursement eligibility levels.
- Explicitly evaluating utility relocation work outside the proposed ROW: The main purpose of this methodology is to explicitly quantify the effect of utility relocation work outside the proposed ROW on (a) total utility relocation costs and (b) the amount of the utility relocation cost that should be reimbursable. This methodology is not actually an alternative method, but more a tool to analyze impacts. As such, it could be used in conjunction with any of other methodologies discussed above, including the traditional length and pole count methods.

Overall, the research team's assessment is that an alternative methodology that involves disaggregating the utility relocation work into logical, manageable construction packages (e.g., by construction method or phasing) is feasible. Two caveats are worth mentioning. The first caveat is that this type of methodology requires disaggregated cost information by segment, which some utility owners might not be willing to provide unless requested. Realistically, utility owners and their consultants already gather disaggregated data when preparing cost estimates and then aggregate the data to provide summary tables as part of the utility agreement. The research team reviewed several utility agreements that included disaggregated cost data by segment or crossing. As part of other involvements with districts and the consulting community, members of the research team have also reviewed utility agreements that included highly disaggregated cost data. However, most utility agreements the research team have seen in the past include disaggregated cost data by cost category but aggregated across segments, which means that a change in business practice would be necessary.

The second caveat is that TxDOT's manuals, procedures, and systems assume utility owners calculate and provide a reimbursement eligibility ratio. TxDOTCONNECT calculates reimbursable costs using an eligibility ratio as an input parameter, which means that updates to this system would also be necessary to implement an alternative reimbursement eligibility method that does not use an eligibility ratio. Currently, to account for each segment or location separately, it is necessary to execute separate utility agreements. The extent to which utility owners follow this approach right now is unknown.

Utility relocation work outside the proposed ROW can be challenging to understand and justify, both for reimbursement eligibility calculations and cost estimate calculations, particularly in situations in which the amount of work is significant. For example, for crossings that include directional boring, the length and amount of work outside the proposed ROW increase as the depth of cover under the highway increased. As the depth of cover increases, so does the total cost. Directional boring parameters include but are not limited to entry and exit angles, angle of deflection, curvature radius, and depth of cover. For angled crossings, the length and amount of work outside the proposed ROW increase as the existing crossing angle decreases and as the length of the longitudinal segments increases.

CHAPTER 5. RECOMMENDATIONS FOR IMPROVEMENTS IN UTILITY AGREEMENTS

INTRODUCTION

The research team reviewed a representative sample of executed utility agreements to better understand current documentation, coordination, and review practices across districts. This analysis provided valuable insight into how TxDOT's procedures are being applied and where small adjustments could strengthen efficiency, clarity, and statewide consistency. Overall, the agreements reflected a strong commitment by district staff to follow established TxDOT requirements. At the same time, the team identified several areas where documentation practices, review procedures, and system integration could be further enhanced to support a more streamlined and transparent process.

During this effort, the research team examined the content and organization of agreement assemblies. The team observed that districts generally maintain a solid understanding of required documentation, but the structure and level of supporting detail varied from one agreement to another. These variations are understandable given the diversity of project types, utility ownership structures, and local procedures. However, they also revealed opportunities to introduce more consistent templates, clearer documentation standards, and stronger quality controls that could reduce review time and simplify coordination between districts and the Right of Way Division.

The recommendations presented in this chapter build on these observations and are intended to enhance the overall quality and traceability of utility agreements. The research team developed targeted suggestions to improve how agreements are prepared and review activities are recorded. These recommendations aim to promote more consistent documentation, clearer communication of project scope and cost eligibility, and smoother coordination between TxDOT and utility stakeholders.

GENERAL AREAS FOR IMPROVEMENT

The research team identified several opportunities to enhance the overall consistency and clarity of utility agreement documentation. Many of these improvements focus on strengthening organization, formatting, and navigability rather than changing core procedures. Standardizing how agreements are structured and assembled would make it easier to review and maintain across districts. Clearer visual organization would allow reviewers to locate critical information more efficiently and ensure each agreement conveys its content in a uniform format.

The research team also observed that improving the visual and digital presentation of agreement files could further support these objectives. Enhanced navigability, such as through bookmarks or hyperlinks in large digital files, would make agreement packages more accessible and easier to use.

Finally, the research team also identified opportunities to improve the workflow associated with assembling and reviewing agreement packages. Implementing internal checklists or automated validation steps within TxDOTCONNECT would help confirm that all required attachments are complete and properly labeled before submission. In addition, developing a standardized "Review Record" summary within each package could provide an efficient way to document reviewer comments and ensure that all revisions are addressed. Finally, offering periodic refresher training on documentation standards and digital formatting would help maintain statewide consistency and support continuous improvement.

Navigability and Readability

Improving navigability and readability requires a standardized digital structure that allows users to move through the agreement efficiently and verify information without re-entering or duplicating data. The following recommendations focus on increasing usability, reducing administrative effort, and supporting future system integration.

- **Develop a digital table of contents.**
  Add an interactive table of contents at the beginning of every agreement package. The table should list each attachment, memo, and checklist with active hyperlinks that navigate directly to the corresponding section. This feature allows users to access specific information, such as the cost estimate, eligibility ratio, or property documentation, without scrolling through the entire file. A digital index also helps confirm that all required attachments are included and in the correct order.
- **Introduce a standardized cover sheet.**
  Create a uniform cover sheet that summarizes key project information: utility name, CSJ, highway limits, county, district, agreement type, total cost, eligibility ratio, and key contacts. The cover sheet should include data fields that auto-populate across all attachments, ensuring consistency and eliminating redundant data entry. This approach prevents errors caused by manual retyping and ensures that all sections of the agreement refer to the same identifiers.
- **Standardize the document assembly order.**
  Define a fixed order for assembling all agreement packages to ensure consistency across districts. A recommended sequence includes:

    1. Cover Sheet
    2. Table of Contents
    3. Review Record Page
    4. Supplemental Agreement Justification From
    5. Utility Accommodation/Adjustment Checklist
    6. Transmittal Memo
    7. Signature Certificate
    8. Main Agreement Form (ROW-U-35 or ROW-U-COA)
    9. Attachments A–H (each with title pages and internal bookmarks)

This uniform structure makes every agreement predictable and easier to navigate, regardless of district or utility type.

- **Implement digital bookmarking and file-naming guidance.**
  Develop guidance in the Utility Manual specifying how to create bookmarks for each attachment and how to name files consistently (e.g., "Attachment A—Plans and Estimate," "Attachment F—Eligibility Ratio," "Attachment H—Property Interest"). Consistent digital labeling supports version control, simplifies file retrieval, and ensures that automated systems can categorize and cross-reference agreements accurately.
- **Require searchable, text-based PDFs.**
  Ensure that all agreement files are generated as searchable, text-based PDFs rather than image-only scans. This allows reviewers to locate key terms, verify data quickly, and extract information such as cost figures or eligibility ratios for analysis. Searchable files also enable future automation of data entry into TxDOTCONNECT or other information systems.
- I**nclude a navigation summary and metadata section.**
  Add a short navigation summary at the beginning of each file that identifies the total number of pages, attachments, and supplemental agreements associated with the project. Include metadata fields that indicate the agreement date, revision number, district author, and form version. These fields provide immediate context and simplify record management and version tracking.

Formatting and Standardization

Enhancing formatting and standardization requires statewide guidance that defines not only what forms to use but also how they should look, read, and flow. Consistent presentations across all districts will help reviewers locate information faster, reduce confusion, and ensure that agreements reflect current policies and federal requirements.

- **Establish statewide templates for memos, checklists, and correspondence.**
  Develop standard templates that use the same structure and visual style across all districts. Routing memos should follow a fixed layout for "To," "Through," and "From" lines, subject lines, and project identifiers, while review checklists should contain uniform fields and optional space for reviewer notes. A standardized structure makes each document easier to read and navigate, regardless of district origin.
- **Require form-version verification prior to execution.**
  Implement a formal step that confirms districts are using the most current form versions before execution. The verification process ensures that every executed agreement reflects the latest language, regulatory references, and formatting standards. Consistent version control also helps avoid confusion when policies or federal requirements change over time.

- **Define formatting standards in the Utility Manual.**
  Add a dedicated appendix in the Utility Manual that specifies uniform formatting parameters. The appendix should establish requirements for font style and size, margin width, heading hierarchy, page numbering format, and file-naming conventions. These standards will ensure that all agreements share a consistent look, regardless of the district that prepares them. A uniform format will also improve compatibility with document management systems and digital indexing tools.
- **Encourage periodic template review and feedback.**
  Schedule periodic reviews of all templates and formatting standards, allowing districts to provide feedback on usability and identify areas for improvement. Continuous feedback will help maintain relevance and ensure that forms evolve alongside TxDOT's processes and technological capabilities.

Content Completeness

Enhancing content completeness requires improving both the narrative and the structure of agreement documentation. Clearer context, consistent cross-referencing, and automated data management will help ensure every agreement fully represents the relocation it authorizes.

- **Strengthen the description of work in the main agreement.**
  Revise the description within the ROW-U-35 form to include a clear summary of the relocation scope. This section should explain the reason for the relocation, identify the number and type of conflicts, describe the actions taken to resolve them, and summarize key constraints or assumptions. A well-written narrative helps reviewers and utility representatives understand the intent of the agreement without consulting multiple attachments.
- **Introduce a front summary page for each agreement.**
  Include a brief, one-page summary immediately following the cover sheet that provides an overview of the relocation. The summary should outline the purpose of the agreement, number of conflicts, nature of the utility adjustments, cost overview, and any important schedule milestones. This context will allow reviewers to understand the agreement before analyzing detailed attachments.
- **Link data fields to maintain consistency.**
  Automate total cost and eligibility ratio calculations so that once verified, they update across all related forms. Linking key fields minimizes human error and ensures consistency between the cost estimate, memo, and checklist.
- **Add a standard section for supplemental explanations.**
  Require each supplemental agreement to include a short narrative summarizing the reason for change. Standardizing this section ensures each supplement records a clear and traceable rationale for revisions.
- **Summarize cumulative revisions for long-term projects.**
  For agreements with multiple supplements, include a one-page summary of all

executed supplementals showing execution date and change in total cost or eligibility ratio. This summary provides a quick, consolidated view of project history.

Workflow and Quality Control

Improving workflow and quality control requires both process standardization and digital integration. Clear documentation of review activities, automated checks for completeness, and centralized validation steps would help districts assemble accurate and auditable agreement packages more efficiently.

- **Create a standardized Review Record page.**
  Include a Review Record page within each agreement package to document all reviewer comments, responses, and approval dates. The record should identify who conducted each review (e.g., district utility coordinator, ROW Division specialist), the date of the review, and a brief summary of any required changes. Embedding this record in the final PDF ensures that the full review history remains part of the permanent agreement file, improving transparency and traceability.
- **Integrate review tracking.**
  Develop a digital workflow that routes draft agreements through the appropriate reviewers and logs their feedback automatically. Each reviewer could approve, reject, or request modifications directly in the system, reducing reliance on email chains. This approach would create a continuous record of review activity that can be accessed by both district and division staff.
- **Automate completeness checks before final assembly.**
  Implement an automatic validation feature to confirm that all required attachments are included before final packaging. The validation process should check for the presence of critical documents, the transmittal memo, and the signed signature certificate before allowing final submission. Automated validation would prevent omissions and ensure that each package meets minimum completeness requirements.
- **Provide training and quick-reference guidance for district staff.**
  Offer short, targeted training sessions on the standardized workflow, validation process, and digital tools used for agreement assembly. Supplement these sessions with a one-page quick-reference guide outlining the steps to prepare, review, and finalize a complete agreement package.

AREAS FOR IMPROVEMENT BY ATTACHMENT

The research team also examined opportunities to enhance the clarity, consistency, and completeness of individual attachments within the standard utility agreement. Each attachment plays an essential role in documenting technical, financial, and legal aspects of the utility adjustment, and small improvements in content structure and presentation could significantly improve overall agreement quality. By refining the way attachments are

prepared and organized, TxDOT can help ensure that each agreement provides a clear and comprehensive record of the proposed work, cost participation, and property interests.

Several attachments could benefit from the use of standardized templates and uniform formatting. Consistent tables, terminology, and data presentation would improve readability and facilitate quicker understanding by reviewers across districts. The research team also recommends including brief explanatory notes or comparison tables where relevant, such as when costs or eligibility ratios differ between the original and supplemental agreements.

Focusing on the visual presentation and digital organization of attachments would also improve their overall usability and long-term value. Using clear and consistent formatting would enhance readability and make attachments easier to navigate. Ensuring that maps, figures, and scanned documents are high quality and properly scaled would help reviewers interpret technical details with greater confidence.

Attachment A—Plans, Specifications, and Estimated Costs

The research team identified several improvements that would strengthen the quality and consistency of the information submitted in attachment A:

- **Adopt a standardized format and minimum content checklist for plan sheets.** Each plan should clearly display existing and proposed ROW boundaries, easement locations, and conflict stationing. Facilities should be labeled by type, size, and material, and any reimbursable segments should be clearly defined.
- **Include vertical profiles and depth information for crossings**. Require that plan sets contain both plan and profile views to illustrate the vertical relationship between the relocated facilities, the roadway, and other utilities. Showing minimum cover, separation, and clearance data will help reviewers confirm compliance with applicable design standards before agreement execution.
- **Document the SUE quality level for all existing utility data.** Each plan sheet should identify the SUE quality level used to locate existing facilities. Including this information provides reviewers with an understanding of the reliability of the data and the potential risks of unknown or inaccurately mapped utilities. Plans prepared with lower-quality data (quality level C or quality level D) should include notes identifying areas that may require further investigation before construction.
- **Strengthen the traceability between plans and cost estimates.** Quantities listed in the estimate should correspond directly to specific plan sheets or stations. Implementing a standardized cost breakdown (e.g., labor, materials, equipment, and overhead) would facilitate consistency and simplify eligibility verification.
- **Promote the use of layered digital plan files.** Layered PDFs or CAD-based submittals enable reviewers to control specific

features, measure distances, and integrate data into GIS platforms. This practice would significantly improve review efficiency and support data reusability for future projects.
- **Encourage early coordination between design and utility coordination staff.** Joint reviews of draft plan and estimate packages before submission can help identify gaps in detail, ensure alignment with project limits, and reduce the need for supplemental actions.

Attachment C—Schedule of Work

The following recommendations would improve the clarity and accuracy of the schedules included in attachment C:

- **Align schedule dates with TxDOT project milestones.** Require that the start and completion dates correspond to the project's letting schedule, environmental clearance, and ROW acquisition milestones. If work cannot begin until a specific condition is met, this dependency should be explicitly stated in the schedule.
- **Include intermediate milestones and task durations.** Each schedule should break down the relocation effort into identifiable phases, such as material ordering, construction, and permitting. Including estimated durations and key completion dates for these tasks enable reviewers to evaluate the feasibility of the proposed timeline and support coordination with roadway construction activities.
- **Develop a coordinated plan to minimize impacts on highway construction.** When significant schedule changes occur, the utility and district staff should jointly prepare a coordinated plan to complete the relocation work while minimizing interference with the highway construction schedule. This plan should outline adjusted sequencing, work windows, or temporary measures (e.g., phased relocations, night work, or temporary service connections) that allow construction to continue safely and efficiently.
- **Encourage the use of standardized scheduling templates.** Develop a standard format for Attachment C that includes fields for milestone descriptions, durations, dependencies, and comments. A consistent structure will make schedules easier to compare, review, and integrate with TxDOTCONNECT or project scheduling tools such as Primavera.

Attachment F—Eligibility Ratio

The following improvements would help ensure that attachment F provides clear, consistent, and well-supported eligibility ratio calculations:

- **Require documentation of the calculation procedure.** Attachment F should include a concise summary of the mathematical process used

to derive the eligibility ratio. The description should identify the parameters used (e.g., total and eligible lengths, and number of conflicts) and the method and sequence of steps applied to calculate the percentage.

- **Provide clear reference to the measurements used.**
  The attachment should include station numbers, segment limits, or facility identifiers that correspond directly to the plan sheets in Attachment A. When feasible, a small diagram or table should illustrate the measured sections used in the calculation.
- **Include a brief explanation of assumptions and supporting rationale.**
  When estimates or assumptions are necessary due to data limitations, a brief note should describe what was assumed and why. This explanation would allow reviewers to understand the reasoning behind the ratio and maintain transparency for future audits.
- **Summarize alternative calculations or design options considered.**
  The attachment could include a short narrative or table identifying other relocation alignments or construction methods that were evaluated and explaining why the selected option was chosen. Documenting these alternatives provides assurance that the adopted design represents the most appropriate and cost-effective solution.
- **Cross-verify eligibility ratios across all agreement components.**
  Establish a quality-control step to ensure that the eligibility ratio recorded in Attachment F matches the values shown in the agreement form, cost estimate, and TxDOTCONNECT. Automated validation within TxDOTCONNECT could help flag discrepancies before agreement execution.

Attachment H—Proof of Property Interest

The following improvements would enhance the clarity and reliability of the materials included in attachment H:

- **Ensure the quality and legibility of all supporting documentation.**
  All affidavits, deeds, and related records should be scanned at sufficient resolution and reviewed for readability before inclusion. Handwritten or typewritten documents should be accompanied by a transcribed or retyped version to ensure legibility for reviewers and auditors.
- **Document utility name changes or ownership transitions.**
  When the current utility name differs from the one shown in the original property documents, the agreement should include supporting documentation, such as a certificate of name change, merger notice, or asset transfer agreement, confirming that the current utility is the lawful successor and retains the compensable interest.

CHAPTER 6. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The purpose of the research was to review and provide recommendations on the methodologies TxDOT uses to determine reimbursement eligibility and calculate utility reimbursement amounts. The research team conducted a review of national practices that included an analysis of relevant laws, regulations, and manuals, as well as interviews with state DOT officials. The research team conducted an analysis of a sample of utility agreements at TxDOT, including a review of reimbursement costs and reimbursement eligibility calculation methodologies, and prepared recommendations for implementation. The recommendations include strategies to consider for the calculation of eligibility ratios as well as strategies to improve the quality of utility agreements to make the review and approval process more consistent, accurate, and reliable.

Review of National Practices

The research team completed a review of practices nationwide to determine what potential practices might be applicable in Texas with respect to methodologies for calculating utility relocation reimbursement levels. The research team reached out to officials at 48 DOTs. The research team received feedback from 33 state DOTs and conducted interviews with officials at 28 state DOTs. From these interactions, the research team learned about eligibility calculation procedures, issues with current practices, and strategies that state DOTs might be considering.

High-level trends based on the responses from 33 state DOTs include the following:

- 18 state DOTs (54 percent) use the pole count method.
- 23 state DOTs (70 percent) use the length method.
- 27 state DOTs (82 percent) use the cost method. Of this total:
    - 12 state DOTs (36 percent) use a reimbursement percentage, and 15 state DOTs (46 percent) use eligible costs.
    - 10 state DOTs (37 percent) only use eligible costs (not reimbursement percentage) for reimbursement eligibility calculations.
- 24 state DOTs (73 percent) calculate eligibility including affected facilities outside the proposed ROW.
- 30 state DOTs (91 percent) include work on private property in the utility relocation cost estimate.
- 23 state DOTs (70 percent) consider reviewing the reimbursement eligibility after utility owners submit actual utility relocation costs.

State DOTs that use reimbursement percentages using the pole count and length methods tend to experience similar issues and challenges as TxDOT. By comparison, state DOTs that only use eligible costs (i.e., not reimbursement percentages) indicated they are satisfied with this method because it is straightforward to understand and use. Last, state

DOTs that do not include affected utility facilities on private land tend to experience more complaints from the utility industry than state DOTs that calculate eligibility including affected facilities outside the proposed ROW.

Baseline Analysis

The research team analyzed 60 utility agreements and companion documents associated with projects with letting dates beginning in fiscal year 2019. Of the 60 agreements analyzed, 38 agreements used the length method, 8 agreements used the pole count method, 11 agreements used a cost method, and 3 agreements used a method that accounted for each facility separately.

Of the 60 agreements, 13 agreements included an elective betterment. Only four agreements included salvage credits, of which two agreements were for electric utilities and the other two agreements were for communication facilities. One agreement included both an elective betterment and a salvage credit. For this agreement, there was a discrepancy between the eligible cost shown in the agreement and the amount reported in TxDOTCONNECT. In the agreement, the utility owner first applied the salvage credit, then the betterment ratio, and finally the eligibility ratio. In contrast, in TxDOTCONNECT, the betterment ratio was applied first, followed by the salvage credit, and finally the eligibility ratio. Utility agreements that included forced betterments lacked sufficient documentation to support the forced betterment. In some instances, the justification for the forced betterment was only a short paragraph stating the change based on a change in the utility owner's policy.

The research team noticed significant differences in practices with respect to how utility owners prepare and assemble utility agreement packages. The focus was on how different practices affect eligibility ratio calculations.

Some plans were effective in showing the location of existing and proposed utility relocations. These plans made effective use of symbology, colors, and other graphical elements to clearly show the location of existing utility facilities, proposed utility relocations, lengths of eligible facilities (or eligible poles), existing ROW lines, and proposed ROW lines. Other plans were too cluttered, lacking critical information to understand the basis of the eligibility ratio calculation. These plans often did not show basic information about the highway project (e.g., existing ROW lines, proposed ROW lines, existing edge of pavement, proposed edge of pavement, drainage structures, and utility easements).

Most plans, regardless of utility type, did not adequately show the location of other existing utility facilities. Although this information was not critical to ascertain reimbursement eligibility ratio calculations, it nevertheless provided background and context to the proposed utility relocation. Likewise, most plans did not show the location and extent of the utility conflicts that gave origin to the need to relocate an existing utility facility.

Utility agreements typically showed the total estimated utility relocation cost and the eligibility ratio. As appropriate, they also included the elective betterment ratio, salvage credit, and justification for a forced betterment. Only a few utility agreements showed the estimated eligible cost. In all cases, the research team conducted a manual calculation of the eligible cost and compared the result with the amount shown in the agreement as well as TxDOTCONNECT. In several instances, the amounts differed.

A handful of utility agreements included joint bid relocations. Most of the agreements included copies of the calculation using TxDOT's standard Excel template. However, the numbers shown and the terminology used to label the numbers were not intuitively clear. Part of the reason is that the Excel template mixes eligibility calculations with payment calculations. Understanding the numbers would be easier if the two sets of calculations were shown in two separate sections.

Comparison of Reimbursement Eligibility Calculation Methodologies

The research team reviewed a sample of 18 utility agreements to identify potential ways to improve the reimbursement eligibility calculations that TxDOT has used for decades. The analysis included the length method, the pole count method, and the CER method. For each of the agreements, the research team also analyzed alternative reimbursement eligibility calculations.

Reimbursement eligibility calculations based on length were straightforward. However, the length method was sensitive to the quality and completeness of the information included in the utility agreement. Several utility agreements the research team analyzed had errors. These errors were often measurement errors that resulted from quality issues affecting the plans the utility owner was using. The research team also encountered issues in situations in which the plans did not clearly show the existing or proposed ROW lines.

Reimbursement eligibility calculations based on pole counts were straightforward. However, the pole count method was sensitive to the number of poles in the calculation, particularly in situations in which the number of poles was low. In general, as the number of poles involved decreased or facility variability along the line increased, the risk of overestimating or underestimating reimbursement eligibility increased. The calculations also relied on the assumption that utility lines (including pole accessories) were uniform and homogeneous.

CER calculations were conceptually simple to understand but more difficult to use. Because the CER method used the length method or the pole count method for individual components, the CER method was sensitive to the same issues affecting the length and pole count methods. CER calculations were also sensitive to significant differences in eligibility levels among segments or locations. Furthermore, the research team found cases in which the actual CER calculation had errors, confirming difficulties users often encounter in understanding and using the CER method.

Elective betterments increased the level of complexity in the calculations. A trend the research team noticed was that the elective betterment percentage applied to the entire relocation cost, even though the betterment was associated with one component of the entire utility relocation. In addition, supplemental agreements with changes in the estimate relocation cost did not include disaggregated cost data for betterments, making it difficult to ascertain the impact of the betterment on the corresponding relocation component.

The research team analyzed three main types of alternative methodologies:

- Dividing segments according to reimbursement eligibility: The main criterion for dividing segments was whether the utility segment had a property interest or a prior right. This methodology is conceptually simple. If the utility owner provides disaggregated data by segment, the methodology is also easy to apply. However, the methodology becomes increasingly difficult to use whenever the construction method or phasing spans multiple segments, which is often the case with longitudinal installations.
- Dividing segments by construction method or phasing: The main criterion for dividing segments was the type of construction method or phasing used. An advantage of using this method is that different construction methods often have drastically different cost levels, which is beneficial in situations in which the various segments also have different reimbursement eligibility levels. However, two practical challenges are as follows:
    - Some utility owners might not be willing to provide disaggregated cost data unless requested. Realistically, utility owners and their consultants already gather disaggregated data when preparing cost estimates and then aggregate the data to provide summary tables as part of the utility agreement. The research team reviewed several utility agreements that included disaggregated cost data by segment or crossing.
    - TxDOT's manuals, procedures, and systems assume utility owners use an eligibility ratio. TxDOTCONNECT calculates reimbursable costs using an eligibility ratio as an input parameter, which means that updates to this system would also be necessary to implement an alternative reimbursement eligibility method that does not use an eligibility ratio. Currently, to account for each segment or location separately, it is necessary to execute separate utility agreements.
- Explicitly evaluating utility relocation work outside the proposed ROW: This methodology is not actually an alternative method, but more a tool to analyze impacts, particularly in situations in which the amount of work is significant. For example, for crossings that include directional boring, the length and amount of work outside the proposed ROW increase as the depth of cover under the highway increases. Likewise, for angled crossings, the length and amount of work outside the proposed ROW increase as the existing crossing angles decrease and as the lengths of the longitudinal segments increase.

Strategies to Improve the Quality of Utility Agreements

The review of agreement assemblies conducted for this research revealed that variations in content, completeness, and documentation practices can directly influence the accuracy and efficiency of the reimbursement process. While the overall structure of the standard utility agreement provides a solid framework to meet federal and state requirements, opportunities remain to strengthen how information is organized, verified, and managed across districts. The following strategies outline key actions that can help improve the clarity, consistency, and overall quality of utility agreements statewide.

A key strategy is to standardize the agreement assembly and review process. Implementing a consistent statewide approach, supported by uniform templates, naming conventions, and automated validation tools, would minimize discrepancies and ensure that all required attachments are complete and compliant before execution. Including a "Review Record" section within each package would also facilitate traceability of comments and approvals, promoting accountability throughout the review process.

The quality of agreements can also be improved by enhancing guidance and training for district personnel and utility owners. Instructional materials and annotated examples for completing the agreement and its attachments would help ensure consistency in how critical items, such as cost estimates, eligibility ratios, and proof of property interest, are documented. Regular training opportunities should emphasize the importance of clear documentation, complete cost justifications, and adherence to federal and state requirements.

Another important strategy involves optimizing the organization and accessibility of supporting documentation. Agreement packages should be structured to clearly convey project context and facilitate review. A standardized cover page summarizing the scope, type of conflict, estimated costs, and eligibility ratio would help reviewers quickly understand the content of each agreement. Maintaining uniform file names and attachment sequences would further improve efficiency during audits and subsequent project reviews.

Finally, strengthening coordination between districts and the ROW Division is essential to sustain uniform practices and continuous improvement. Regular communication and inter-district peer exchanges could help identify recurring issues, share effective solutions, and promote alignment with evolving policies and procedures.

RECOMMENDATIONS

The results of this research identified opportunities for TxDOT to strengthen the consistency, accuracy, and efficiency of its utility reimbursement and agreement processes. While the current policy framework provides a solid foundation, implementation of several procedural and technological improvements would help ensure more uniform statewide practices and clearer documentation. The following recommendations describe practical actions that TxDOT can take to integrate the findings of the research into daily operations and long-term policy development.

Standardize and Refine Reimbursement Methodologies

TxDOT could establish clear statewide guidance for selecting and applying reimbursement methodologies. Implementation should include:

- Developing standardized templates and calculation tools for the length, pole count, and CER methods.
- Ensuring the standardized tools automatically apply eligibility, betterment, and salvage credits in the correct order.
- Providing district staff with flowcharts and examples to guide selection of the appropriate methodology for each project scenario.
- Periodically auditing a sample of agreements to verify correct application and identify areas for further clarification.

Improve Guidance and Templates for Agreement Preparation

To ensure greater consistency across districts, TxDOT could revise and expand the guidance associated with the preparation and assembly of standard utility agreements. Recommended implementation steps include:

- Updating the Utility Manual or guidance documents to include annotated examples, particularly for Attachments F (Eligibility Ratio), G (Betterment), and H (Proof of Property Interest).
- Providing detailed instructions for documenting unique circumstances such as corporate name changes, replacement easements, and valuation of compensable interests.
- Creating a standardized cover summary page summarizing project scope, utility owner, cost participation, and eligibility ratio.
- Creating an indexed agreement package in PDF format with embedded bookmarks that link to each attachment and key section.

Strengthen Coordination and Communication

Implementation should include measures to improve coordination among the ROW Division, districts, and utility owners:

- Formalize early coordination procedures so that eligibility determinations and documentation expectations are addressed early in design.
- Schedule regular coordination meetings or webinars to discuss updates, recurring challenges, and examples of best practices.
- Strengthen coordination between district staff and the ROW Division by establishing structured communication channels, such as periodic check-ins, to ensure consistent interpretation of policies, improve documentation practices, and provide timely guidance on complex reimbursement cases.

Expand Training

TxDOT should expand existing training on the preparation of utility agreements to address evolving policy requirements, documentation standards, and coordination practices. Enhancing the program would help ensure that district personnel, consultants, and utility representatives apply consistent procedures when preparing and reviewing agreements. The expanded training should incorporate interactive and practical components to reinforce learning and promote consistency statewide. Recommended improvements include:

- Incorporating hands-on exercises that guide participants through the complete process of assembling an agreement package and performing eligibility and betterment calculations using real or simulated case studies.
- Integrating peer discussion sessions to promote knowledge exchange among districts and share lessons learned from recent agreement reviews and audits.
- Updating course materials regularly to reflect current federal and state reimbursement requirements, emerging documentation tools, and procedural changes.
- Providing supplemental learning options, such as self-paced online modules, short refresher videos, and quick-reference checklists for day-to-day use.
- Establishing post-training evaluation mechanisms to measure training effectiveness and identify areas for continuous improvement.

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