

## Better Managing Utility Conflicts in Texas through the SHRP2 Solution: *Identifying and Managing Utility Conflicts (R15B)*



Utility conflict management (UCM) is a comprehensive multi-stage process that involves the systematic identification and resolution of utility conflicts during project delivery. Identifying utility conflicts as early as possible facilitates the implementation of optimum strategies to resolve those conflicts. The R15B second Strategic Highway Research Program (SHRP2) product, *Identifying and Managing Utility Conflicts*, includes several tools that agencies can incorporate in existing business practices to identify and resolve utility conflicts. These tools include a standalone template for utility conflict lists, a utility conflict data model and database, and a one-day UCM training course.

As part of the SHRP2 Implementation Assistance Program (IAP), 18 state departments of transportation (DOTs) received grants from the Federal Highway Administration (FHWA) to conduct pilot implementations of the R15B product tools. The goals and scope of the implementations varied widely depending on the needs of the individual state DOTs, but generally ranged from implementation of the standalone utility conflict list on a sample of pilot projects to the development and implementation of enterprise system modules to automate specific UCM features. As part of the IAP, FHWA provided one session of the one-day UCM training course to each of the states.

The Texas Department of Transportation (TxDOT) grant focused on a standalone implementation of the R15B product tools. TxDOT's goal is to have a standardized process for analyzing utility conflicts while enhancing communication among all stakeholders. Another goal is to capture and quantify all impacts on utilities and related dollar amounts, facilitating the delivery of projects on time and within budget.

### ***Challenge Facing the Transportation Agency Using the Product***

TxDOT did not have standards for the exchange of utility information and data in the TxDOT project delivery process. Each of the 25 TxDOT districts had different tools and approaches for capturing limited utility information, which generated inconsistencies at many levels. In addition to not having a standard process for reporting utility conflicts, TxDOT did not have an effective process for reporting non-reimbursable utility relocations. The result was inefficiencies in utility coordination, ambiguity and continuous omission of critical data, and unnecessary utility relocations. It was also common to experience project delays and cost overruns.

### **TxDOT Objectives**

Initially, TxDOT intended to develop a web-based system to automate the collection and analysis of utility conflict data. Because of limitations in availability of IT personnel who could be assigned to work on the pilot implementation, TxDOT changed the focus to a standalone implementation of the R15B product tools. In addition, the agency decided to use internal funds to substantially increase the scope with respect to what the FHWA grant could realistically accomplish. With these changes, the scope of the TxDOT UCM implementation included the following activities:

- Provide the one-day UCM training course at each of the 25 TxDOT districts.

- Implement and monitor the UCM approach using pilot projects at the five metro districts (Austin, Dallas, Fort Worth, Houston, and San Antonio).
- Document lessons learned and disseminate the findings agency wide.
- Prepare updates for the utility manual and other relevant policy documents.

***Approach Taken by the Agency to Implement the Product***

The UCM implementation was divided into two phases. Phase 1 involved providing the one-day UCM training course at the five metro districts (Austin, Dallas, Fort Worth, Houston, and San Antonio). Phase 2 included providing the one-day UCM training course to the remaining districts (20 districts, including urban and rural districts); providing additional one-day UCM training courses to districts as requested; and implementing the UCM approach using pilot projects at the five metro districts.

To date, TxDOT has provided 48 one-day UCM training courses (Figure 1). A total of 1,688 participants have taken the course, 60% of which were TxDOT officials while 40% were non-TxDOT officials (including utility owners as well as TxDOT and utility consultants) (Table 1). TxDOT is scheduling six additional classes during fiscal year 2019.



*Figure 1. Interactive exercise as part of the one-day UCM training course*

Table 1. Participation in one-day UCM training courses.

Fiscal Year		Participants	TxDOT Participants	Non-TxDOT Participants
2016	Total	224	136	88
	Average	45	27	18
	Percentage		61%	39%
2017	Total	836	505	331
	Average	35	21	14
	Percentage		60%	40%
2018	Total	411	267	144
	Average	34	22	12
	Percentage		65%	35%
2019 <sup>a</sup>	Total	217	108	109
	Average	31	15	16
	Percentage		50%	50%
<b>Overall</b>	<b>Total</b>	<b>1688</b>	<b>1016</b>	<b>672</b>
	<b>Average</b>	<b>35</b>	<b>21</b>	<b>14</b>
	<b>Percentage</b>		<b>60%</b>	<b>40%</b>

<sup>a</sup> As of March 31, 2019

The one-day UCM training course is now on the official catalog of TxDOT courses. Beginning in fiscal year 2018, TxDOT implemented a training program that included the one-day UCM training course followed by a 1-.5-day training course on utility coordination topics focusing on policy as well as preparation and execution of utility agreements. Most participants who register for the UCM training course also participate in the utility coordination course.

The five pilot projects where TxDOT implemented the UCM approach were different types of projects at different project development stages when the implementation started:

- Austin District: FM 971 (from SH 95 to SH 130) in Travis County. The scope of the project was to widen lanes, rehabilitate ditches, and add shoulders and bridge culverts. In total, the project involved 37 crossings, nine bridge culverts, and three railroad crossings.
- Dallas District: SH 352 (from Kearney Street to US 80 Eastbound Frontage Road) in Dallas County. The scope of the project was to reconstruct the existing four-lane undivided rural roadway to a four-lane divided urban roadway.
- Fort Worth District: US 377 in Hood and Johnson County (2.5 miles) in Cresson, Texas. The scope of the project was to construct a four-lane bypass around the center of Cresson to help accommodate a bridge over the existing railroad crossing. Fatal crashes at the railroad crossing prompted an accelerated delivery process.
- Houston District: SH 36 in Fort Bend County. This project is part of the SH 36 expansion as a hurricane evacuation route from Rosenberg to the Gulf Coast. The UCM implementation focused on Segments 8–10. The scope of the project was to widen the existing two-lane segment to a four-lane divided cross section.

- San Antonio District: US 281 from Stone Oak Parkway, in Bexar County, to the Bexar/Comal county line. The scope of the project was to widen a four-lane divided cross section to a six-lane freeway with two-lane directional frontage roads. This project had an accelerated project delivery schedule and was designed in 3D.

### UCM Benefits

TxDOT identified the following benefits resulting from the implementation of the UCM approach:

- Significant economic and project delivery time savings. TxDOT identified almost \$10 million in monetary savings and 38 months in project delivery time savings after implementing the UCM approach at the five pilot projects (Table 2). The savings were primarily the result of identifying changes in project design that avoided utility relocations.

Table 2. Economic and project delivery time savings at the five pilot projects.

District	Estimated Economic Savings	Identified Time Savings
Austin	\$0.09 million	n/a
Dallas	\$0.50 million	15 months
Fort Worth	\$1.80 million	38 months
Houston	\$2.90 million	n/a
San Antonio	\$4.60 million	24 months
<b>Total</b>	<b>\$9.89 million</b>	<b>38</b>

- Significant economic savings elsewhere in the state. TxDOT identified additional benefits totaling \$13 million from projects elsewhere in the state that started using the UCM approach. In one instance, savings resulted from the redesign of a drainage pipe to avoid having to relocate major gas lines that crossed the highway and were in conflict with the proposed drainage pipe. In another instance, savings resulted from the completion of a more comprehensive utility investigation and the identification of multiple locations where water and sanitary sewer lines conflicted with the project. The utility investigation revealed lines that were already abandoned, which enabled the district to have more meaningful discussions with the city.
- Active support by leadership. As the positive results from the pilot UCM implementation began to emerge, the TxDOT administration increased its support for the adoption of robust UCM principles throughout the state. In turn, this support accelerated the adoption of the UCM approach at the districts, thanks in part to policy changes and corresponding memoranda intended to optimize the project delivery process at TxDOT.
- A more positive working relationship with the industry. Utility industry officials, particularly at the project level, appreciate the implementation of a more proactive approach by TxDOT officials and its consultants for coordinating with the industry and for identifying and resolving utility conflicts. Due to this positive working relationship, utility owners are willing to coordinate sooner.

### Lessons Learned

Lessons learned at TxDOT from the implementation of the UCM approach include the following:

- The UCM benefits were more evident and substantial for pilot projects that were at an early stage in project development (i.e., preliminary design instead of final design) when the UCM implementation started. For these projects, it was possible to start utility process activities earlier, including utility investigations and identification of potential conflicts. In some instances, districts were able to accelerate certain design activities, e.g., the drainage design, which, in turn, facilitated the identification and resolution of utility conflicts.
- Participants were highly satisfied with the one-day UCM training course. Participants were particularly satisfied with the hands-on exercise because of the opportunities it provided to identify and resolve utility conflicts as a group (Figure 1).
- The one-day UCM training course was important for obtaining buy-in from stakeholders, particularly project managers and designers. Feedback from these stakeholders was that the course opened their eyes about the






need to look at utility issues differently. Many of the stakeholders also commented that more project managers and designers should take the course.

- A review of sample project files identified by TxDOT for the hands-on exercise revealed a need to improve utility data documentation practices. Examples of improvement areas were utility investigation timing, scope, quality, and completeness; mapping and documentation of utility data on project files; and utility conflict locations on project files.
- UCM standardization is critical. TxDOT officials recognized that consultants, contractors, and utility owners frequently operate across district boundaries. Using district feedback, TxDOT developed a custom version of the UCM utility conflict list template, which the agency intends to deploy as new or updated enterprise management systems are rolled out over the next few years. TxDOT will also emphasize the use of other tools to assist with UCM practices, including standard utility layouts to depict the location of utility conflicts, scheduling software, and standardized forms.

**Expectations for Integrating this Product into Normal Business Practices**

TxDOT identified a number of business practices that could be improved through the implementation of the UCM approach. As the UCM implementation proceeds, TxDOT has begun to implement changes to those business processes. Table 3 provides a summary of challenges and the corresponding improvements.

Table 3. Challenges and business process improvements.

Challenge		Business Process Improvements
Utility coordination and utility investigations were occurring too late in the project cycle (preliminary design or review design).		Include utility coordination and utility investigations in preliminary engineering (i.e., schematic) scopes of work and contracts.
Some utility owners would not begin their design until the right of way was acquired due to fear that TxDOT might cancel the project.		Through master utility agreements, TxDOT will reimburse utility owners if projects are shelved or canceled.
Utility owners would not begin their design until all conflicts were identified to avoid redesign.		Some districts include design features (drainage, walls, etc.) at 30% design to identify conflict early.  Through master utility agreements, TxDOT will reimburse utility owners for major design changes.
Utility owners would rely on the highway contractor to clear the right of way.		TxDOT will clear the right of way in advance of the construction project using a Right of Way Division contract.
Major utility relocation could take several years to be completed.		TxDOT designers and project managers will apply the <i>avoid/minimize/accommodate (AMA)</i> principle to manage utility conflicts.

In the short-term, TxDOT will implement the UCM approach more widely throughout the state. This will involve continuing to provide the one-day UCM training course to districts that request it, implementing and monitoring the UCM approach on pilot projects at the remaining 20 districts – documenting and sharing lessons learned.

***For more Information:***

To learn more about Texas's use of *Identifying and Managing Utility Conflicts* (R15B), contact Charon Williams, TxDOT Utility Portfolio Director, at [Charon.Williams@txdot.gov](mailto:Charon.Williams@txdot.gov) or Anna Pulido, Utility Manager, TxDOT San Antonio District, at [Anna.Pulido@txdot.gov](mailto:Anna.Pulido@txdot.gov)

To learn more about SHRP2 and the *Identifying and Managing Utility Conflicts* product, contact Julie Johnston, FHWA Utility & Value Engineering Program Manager, at [Julie.Johnston@dot.gov](mailto:Julie.Johnston@dot.gov).

**AASHTO SHRP2 Website:** <http://shrp2.transportation.org/Pages/UtilityRelatedProducts.aspx>

AASHTO's product page offers case studies, training modules, presentations, factsheets, guidance documents, and a list of other states implementing the SHRP2 utility products.