

Smarter Intersections Pilot Project

Project Overview and Pilot Intersections

The Stage 1 Smarter Intersections Pilot Project focused on five intersections in College Station, Texas. It was conducted over an 18-month period from September 15, 2023, to March 15, 2025. College Station is a mid-sized community with a population of just over 120,000 in 2021. It is also home to Texas A&M University, the largest university in the state, with nearly 75,000 students. With the large student population, College Station has a high volume of walkers, bikers, and bus riders. There are also strong partnerships among the city, university, TxDOT, and local agencies.

The Smarter Intersections Pilot Project deployed and tested smart infrastructure technology in College Station to achieve two main goals: improve intersection safety and mobility for pedestrians, bicyclists, and mobility device users, including people with mobility and visual disabilities; and demonstrate that the technology functions as proposed. Technologies used in the project fell within the categories of connected vehicles, intelligent sensor-based infrastructure, and smart technology traffic signals. The project used cellular vehicle-to-everything (C-V2X) roadside units (RSUs) at five intersections in tandem with onboard units (OBUs) in transit vehicles to do the following:

- Alert pedestrians and bicyclists using crosswalks and bike lanes of turning buses. This alert was provided through auditory and visual cues from pole-mounted devices that receive information from the C-V2X RSUs.
- Explore the feasibility of incorporating related vehicle information into a smartphone application that blind/low-vision (B/LV) individuals could use to navigate the intersections.
- Communicate with automated shuttles to alert them of turning transit and emergency response vehicles at the intersection.

The location of the five pilot intersections are shown in Figure 1.

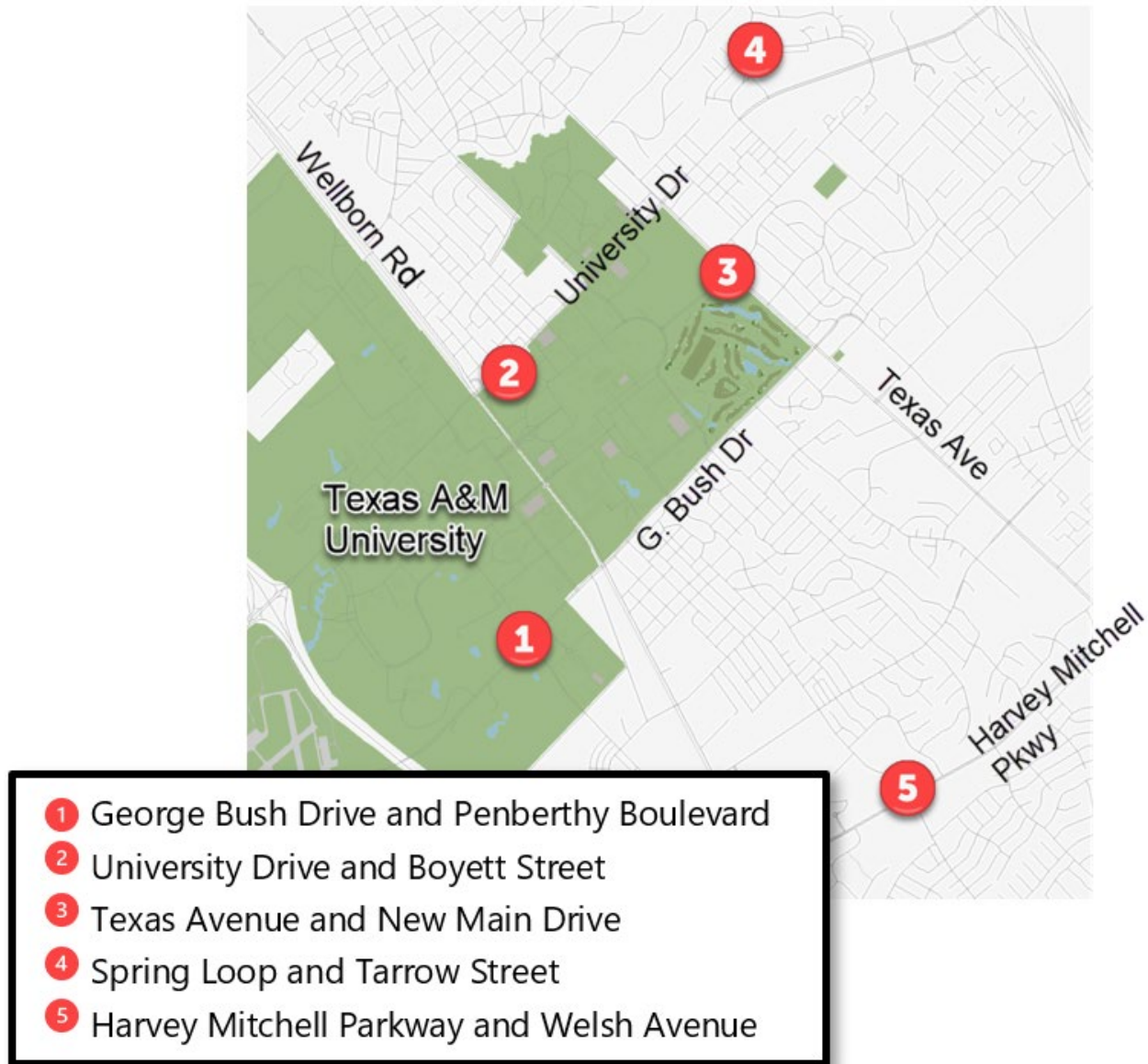


Figure 1. Pilot Intersections

The project provides visual and audible alerts to pedestrians and bicyclists that a bus is turning at the intersection. A bus equipped with an OBU broadcasts a Basic Safety Message (BSM) 10 times a second as it is approaching the intersection. The RSU at the intersection receives the BSM and sends it to a laptop computer inside the signal cabinet, which activates the visual and audio alert based on the signal status, detector status, and the bus position. Figure 2 illustrates the activated illuminated bus sign at Texas Avenue and New Main Drive.



Figure 2. Illuminated Bus Sign at Texas Avenue and New Main Drive

The partners in the Smarter Intersections Pilot Project included the Texas Department of Transportation, the grant recipient; and the Texas A&M Transportation Institute, which conducted the project. Other public- and private-sector partners supporting different project elements included the City of College Station, Texas A&M University Transportation Services, the Brazos Transit District, and Beep, an automated shuttle operator.

As part of the pilot project, TTI researchers monitored the performance of the system over a four-month period from November 2024 through February 2025. Examples of the data logs are provided in the data package. The project also simulated communication with an automated shuttle and a fire truck. Information on the process used for these simulations and the results of the automated shuttle simulation are provided as separate file. Files on the script used to interview pedestrians and bicyclists at the intersection to obtain their feedback and results are provided. The questions and results from the online survey of Texas A&M University bus operators are included in the data package. The project also developed and tested a beta smartphone app for use by B/LV individuals. Files with the interview questions used with B/LV individuals in developing and testing the app and the results are provided. As required with research involving

human subjects, protocols, scripts, recruitment process, ,and other items for the interviews and surveys conducted during the project were developed and submitted to the Texas A&M University Institutional Review Board (IRB). All of the protocols were approved.