Road signs are second only to road condition as the most prevalent source of transportation-related litigation. Maintaining the proper sign configuration on a section of road as originally intended by a traffic engineer becomes more difficult over time as signs are replaced, damaged or stolen. This challenge can make government entities vulnerable to lawsuits and the motoring public at risk from inadequate or improper signage. Boulder County, Colorado, is no exception. One of the fastest growing counties in Colorado over the past 10 years, its population increased nearly 30 percent to 291,000. Most cities in the county saw substantial growth, with one municipality growing more than 3,400 percent! Situated at the northwest edge of the Denver metropolitan area, Boulder County covers 1940 km² (750 square miles) of urban and suburban development, a state university and a concentration of high-tech businesses and research labs. The terrain is quite diverse—rolling plains to the east and rugged foothills and mountains to the west.

Previously, when performing inspections of a particular road section, updating or replacing missing signs required a minimum of two trips to and from the site to the office for comparing memory to paper maps and videotapes. Not exactly the most efficient manner in which to maintain road signs, but the only one available at the time. Then along came GPS and GIS.

Beginning in 1995, the Boulder County road maintenance department established a GIS (geographic information system) that included centerline, culvert, bridge, and other transportation layers. Using Trimble® GPS Pathfinder® Pro XL equipment and Pocket PC handhelds to collect data, field workers produced spatially accurate maps with attributes for each feature.

In 2000, John Mosher of the Boulder County road maintenance department took it one step further by implementing a new method of sign inventory and maintenance using some of the latest, yet affordable mobile GIS software and hardware products. ESRI® ArcPad™ software was installed on handhelds, allowing Boulder County Sign Shop personnel to carry a portable PC with them in the field to log data. Use of ESRI GIS software allowed consistent flow from the GPS equipment into the database. The handhelds contained accurate and up-to-date digital maps of more than 7,000 road signs with essential information—GPS location, sign type, condition, etc. Employees were able to update information on an existing sign in the database while standing right in front of it. Missing, incorrect or damaged signs became easier to locate and replace—and roadside inspections became faster and more accurate. Field data can be downloaded directly from the handheld into the database and then transferred to the network and integrated with the master sign database. An updated sign Shapefile is then sent back through the network to the handhelds, giving the field worker access to the most current version of the digital “live” sign map. The digital map is current within one week or less.

PROJECT: GIS Road Sign Inventory and Maintenance

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PROJECT HIGHLIGHTS

- Total annual savings calculated at more than $20,000
- Increase in overall productivity
- Efficient collection of high quality attribute data
- Robust GPS integration with proven field technology

Customer story
Boulder County Road Maintenance Department
The savings, in cost and efficiency, were immediately apparent. Employee mileage for sign replacement and inspection, together with paperwork, and data entry errors have been greatly reduced. The Road Maintenance Sign Shop now has three sign technicians using this system, resulting in savings of one to two hours per day for each employee. The time that is saved can be spent performing additional maintenance work in the field (rather than in the shop), thereby increasing overall productivity. Total annual savings have been calculated at more than $20,000. In addition, Sign Shop employees have developed a stake in the success of the program and take pride in their contributions. Boulder County recently purchased Trimble GeoXT™ handhelds which combine a GPS receiver and field device in one unit—allowing for even more mobility for its work crew.

Boulder County road signs have become extremely accurate, providing the public with the level of safety that was originally engineered into a particular section of road. The County’s liability from missing, incorrect or incorrectly placed signs is significantly reduced by the increase in accuracy. This program has been recognized at both a local and national level. John Mosher received Boulder County’s Annual Innovation/Achievement Award and the program was a NACo (National Association of Counties) Achievement Award Winner in 2001.

For more information on Trimble GPS Pathfinder receivers or GeoXT handhelds visit: www.trimble.com/pathfindersys.html, or www.trimble.com/geoxt.html.

For more information on the Boulder County road maintenance department visit: www.co.boulder.co.us/transportation/maintenance/index.html.