



County of San Bernardino, California

Traffic Road Book Quality Control Using ArcGIS Server

Problem

The County of San Bernardino, California, needed an automated method for locating and displaying county road data that could be used by any department.

Goals

- Add a GIS component to the Traffic Road Book Accepted Data Reporting page.
- Improve the user's ability to search for, locate, and display individual county roads.
- Take advantage of existing databases and procedures.
- Efficiently develop and deploy a solution.

Results

- Staff can now easily locate and display individual county roads.
- County road reporting mechanism includes GIS functionality.
- Legacy databases and procedures continue to be productive.
- Staff can demonstrate a successful rapid application development strategy.

The San Bernardino County Traffic Road Book has been in use for more than 30 years. The Traffic Road Book serves as an invaluable resource for county departments, such as the Public Works Department, to help staff respond to public inquiries. It is often referenced in reports and work orders. It is a large, hardbound book of black-and-white maps that presents a complete inventory of streets and street segments maintained by the largest county in the continental United States. The book is a collection of 166 maps divided into 37 pages showing roads and other thematic layers for multiple urban areas and 129 pages illustrating individual urban areas. Road features were not updated often until recently when the county decided to produce a new, full-color Traffic Road Book using ESRI® ArcGIS® software.

The Challenge

The Information Services Department (ISD) was tasked by the Department of Public Works—Transportation Traffic Division to translate approximately 21,000 road sequence records, representing nearly 2,900 miles of roadwork, from a DB2® database maintained by the Traffic Division to geometries in an ArcSDE®—Oracle® database, then provide the Traffic Division with a means to validate every road segment.

The original road segment information was stored as sequence records, which contain a sequence limit description for each road segment. The description is a freely formatted textual description of a section of road that logically defines the start and end points. For example, the sequence limit description "0007M W,JACKSON E/0003M W,RANCHO AV" means the sequence starts 7/100 of a mile west of Jackson and goes east until it reaches 3/100 of a mile west of Rancho Avenue. To complicate matters further, not all sequence limit descriptions follow the standard format.

Rick Pourroy, the ISD senior geographic information system (GIS) programmer analyst, wrote ArcObjects™ programs to directly read the DB2 sequence limit descriptions and translate them, using the county street centerline feature class as a base, into the geometry required for a new ArcSDE—Oracle Traffic Maintained Road feature class. Pourroy architected a database structure,

Before



After



A page in the old San Bernardino County Traffic Road Book (on the left) compared to the same page in the new Traffic Road Book.



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ESRI Software Used

ArcGIS Server
ArcSDE
ArcGIS Desktop

"By using the templates included with ArcGIS Server, we were, within hours, able to deploy an application that fits our business needs—as opposed to programming from scratch, which would have taken us days or even weeks."

Mike Cohen, Systems Development Team Leader

created programs, and defined workflow to provide for the integration of this new feature class into a system that allows mapping, continued maintenance, and synchronization from the DB2 data.

What was then needed was a method that allowed Traffic Division staff to review the results of the data translation by locating and displaying individual road features for inspection.

The Solution

André Larabie, ISD programmer analyst, created an online automated reporting tool that references a SQL table created during the translation process. The report simply lists all the road feature records in the Traffic Maintained Road feature class. The report is re-created each time the Web page is opened. "Our intention is to provide users with a complete online review process," says Larabie. "They can review the whole conversion process without having to refer to any paper documents."



The San Bernardino County Traffic Road Book reporting system is based on the Search Template included with ArcGIS Server.

Sequence Link	Road Number	Road Seq	Road Name	Date	Map Link
END HUNTER	104500	050	ADAMS STREET	20060504	View map for 104500050
END BARRYWAY AVE	106080	010	ARWAY COURT	20060504	View map for 106080010
CEDAR TER SELWAYESTERN DR	111520	010	ALDER TERRACE	20060504	View map for 111520010
0015M S OSAGE ST INDIANA ST	118090	010	AMARYLUS AVENUE	20060504	View map for 118090010
END HOLYMYRIC VIEW DR	122076	060	ANOCHEGER AVENUE	20060504	View map for 122076060
0002M S ARLISS DR INEND	125550	010	ARLISS LANE	20060504	View map for 125550010
ORANGE WOOD RD E/END	131390	030	ARROYO VISTA DRIVE	20060504	View map for 131390030
IRONWOOD DR E/07M	136660	026	ATHOL STREET	20060504	View map for 136660026
CALLE LOS AMIGOS INEND	132250	010	AVENIDA LA CANDELA	20060504	View map for 132250010
SERRA VISTA INBUENA VISTA	151650	070	BALSA AVENUE	20060504	View map for 151650070
VALLEY BLVD INRANDALL	160060	030	BEECH AVENUE	20060504	View map for 160060030
CLEVELAND DR E/0004M W/TERRACE	163590	010	BENEDICT ROAD	20060504	View map for 163590010

The Traffic Road Book Accepted Data Reporting page provides a hyperlink at the end of each line that the user can click to view a map for that road segment.

The report includes a hyperlink that launches an ESRI ArcGIS Server Web mapping application. "We felt that the reports would be much more complete by having a GIS component that would display a map of the area being investigated," says Mike Cohen, systems development team leader. "Behind the scenes, a very complex data conversion process is taking place, which includes integration of a custom ArcGIS Desktop application with the Microsoft SQL Reporting Server to help produce the report. However, all this is hidden from the user, who simply clicks a link on the Web page report and is provided with an online map of the area of interest."

The hyperlink is embedded with special "keys" that identify specific road segments. By clicking on the link, an online map of the selected road feature is presented. The map includes noncounty roads; other thematic features, such as jurisdictional boundaries; and imagery.

The Web application that contains the online map is a slightly modified version of the Search Template included with ArcGIS Server. Users can enter new search parameters, such as the road number, to generate a new map. They can also navigate the map by zooming in or out or panning.

For More Information



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Results

Adding a GIS element to the Traffic Road Book Accepted Data Reporting page eliminated the need to manually research the county road segment information contained in the conversion reports. Instead, a click on the hyperlink loads a map showing the location of the reported road without the user having to load or run special software. Anybody within the organization can view the maps using a Web browser without having to know anything about GIS.

Additionally, both the Public Works Department and ISD were able to take advantage of established databases and procedures by simply adding to the functionality of a Web application template. "It hardly took any time to modify the template, and it worked immediately," says Cohen. "This important mapping functionality was added in about six hours and fully supports the reporting tool. We estimate that it would have taken three or four days to develop an application on our own that provided the same functionality as the ArcGIS Server template."

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