## Winter 2008 - Department Spotlight: Dakota County Physical Development Division's Land Management Information System

By Kent Tupper

As part of a Process Improvement Project for the Physical Development Division, a workgroup examined current processes involved in the management of land acquisition, easements and other associated activities in the Division that are related to real property. Parks, Transportation and the Farmland and Natural Area Program (FNAP) acquire property and easements as a part of their regular business. One of the recommendations the workgroup came up with was to create a centralized database to keep track of all the information pertinent to these acquisitions.

Many challenges will have to be overcome in order to make this recommendation a reality. One big challenge is, how do we centralize this information and make it easy to find? The answer: GIS. Using GIS as the interface to access this land-based information makes sense, as it provides the ability to access other, related land information at the same time. This second ability helps with another challenge: how do we standardize the information for all these different types of acquisitions? Yes, there are similarities found in these processes, but there are also many differences. Another challenge is how to most efficiently accomplish the task of collecting all this information and then create the database and user applications needed to enter, retrieve and analyze it. Again, GIS is a big part of the answer. Because the spatial component of GIS data can be linked and related spatially, these different acquisition processes can be developed as components that are integrated through GIS.
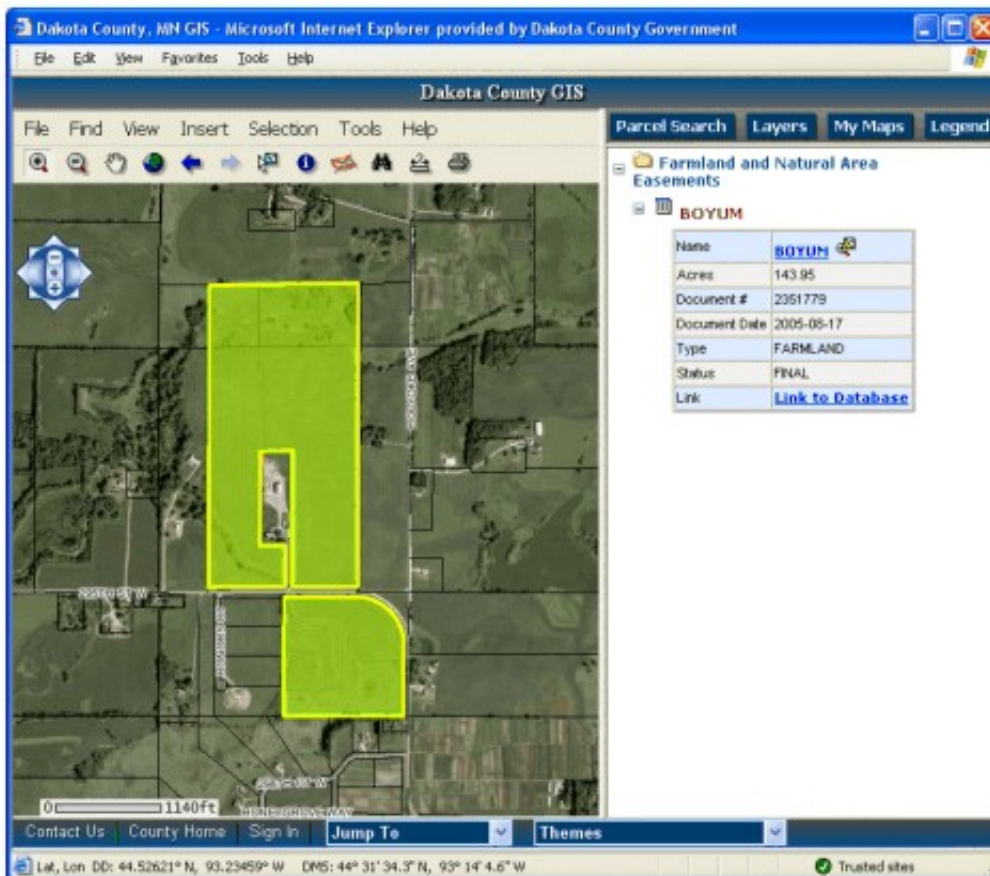
Another key in the development of this information system is the collaboration between the County's IT Department and the Office of GIS. The tabular database and user interface for this information is being developed

by the IT Department, working in close collaboration with Parks, FNAP, Transportation and GIS. The database is being developed in the County's enterprise Relational Database Management System (RDBMS), which will give it the capability to easily integrate with other county data and give the security and reliability of such a system. This database will provide a link to the County's GIS databases, which will in turn have the ability to link back to the RDBMS.

Documents such as deeds, easements, contracts and other types of agreements, will be linked to the County's Electronic Document Management System (EDMS). The key to making this information centralized and giving the user access to a wealth of information in one spot is GIS. The GIS interface used in this application contains almost 200 layers of geographic information such as tax parcels, tax forfeited property, flood plains, soils, geologic information, areas of environmental concern, etc., all accessed from one web application.

FNAP is the first piece of the land management information system presently under development. IT's Rapid Application Development (RAD) process is being used for the development of these multiple components. This strategy gives the users a useable product in the shortest amount of time. Developers receive feedback from users in a real world environment and respond in iterations with enhancements based on this feedback. It helps break a very large application into manageable pieces, and provides the users with information early on in the process.

The FNAP component of the land information system will be rolled out this January, with the Parks and Transportation pieces to follow this spring and summer. Hopefully this type of development and collaboration will become a model for many future applications countywide.

Winter 2008 - Desktop GIS: Adding Dakota County GIS Layers to Your Map Document as an ArcIMS Feature Service

By Scott Laursen

Most Dakota County employees are familiar with Dakota County GIS (DC GIS), our one-stop web map shop for data layers from departments all over the County. But did you know that you could add those same layers to your ArcMap document, complete with the same symbolization that you see in the online version? The Office of GIS has created an ArcIMS Feature Service of the DC GIS layers which allows internal Dakota County employees to add any or all of the layers in the same manner that you add regular data.

An ArcIMS Feature Service lets you access data stored on someone else's server. Instead of downloading the data onto your server or PC, it is simply streamed over the Internet, just like a video or a web music service. However, users of an ArcIMS Feature Service are not limited to passively consuming the streamed content. Instead, when accessed through ArcMap, the streamed data layer acts just like a shapefile or geodatabase feature class. The features can be symbolized and labeled, the attribute table can be viewed, reordered, and queried, etc.
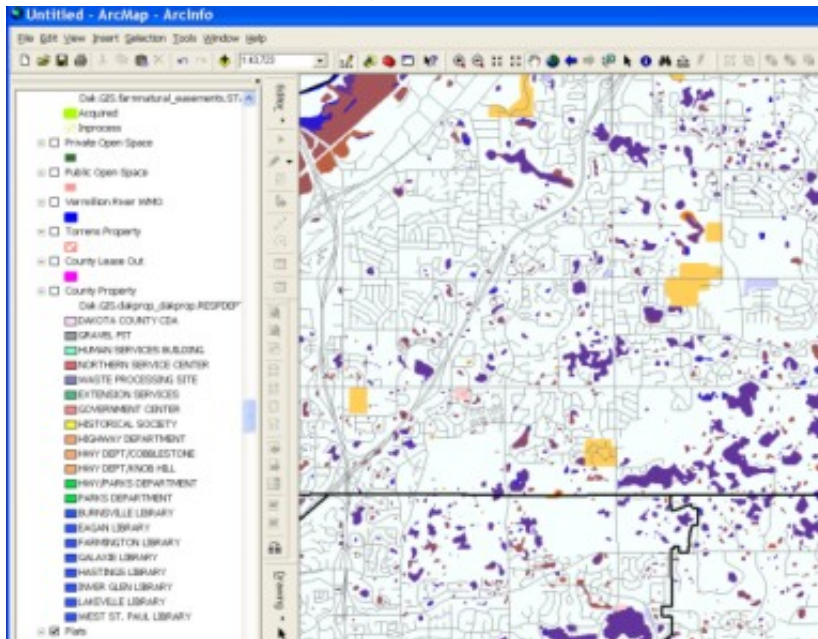
The advantages of using an ArcIMS Feature Service are probably obvious to you. Users save storage space on their servers and PCs, because the data layers are streamed, not downloaded. Users no longer need to spend time digging through folders on the server trying to find the data layer they need for their map. If a user wants to have their own copy of the data to make edits, the feature service can be exported as a shapefile or feature class. On the other hand, since it is a "feature" service, raster data cannot be accessed in this manner. (Raster data can, however, be streamed using an ArcIMS Image Service.)

The DC GIS ArcIMS Feature Service that the Office of GIS has set up is accessible by any Dakota County staff person who has ArcMap. If you are interested in getting it set up on your machine, contact a GIS staff person and we will walk you through the process. Once the link to the service is established, you will be able to add any or all of the DC GIS feature layers as data layers to your ArcMap map document. You will be amazed at the time and effort you will save!

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Winter 2008 - GIS 101: The "Wow" Factor

By Randy Knippel, Dakota County Office of GIS

One of the pleasures of working with GIS is the ability to create impressive visual presentations. This typically involves using sophisticated software to process data, analyze it, and create maps to represent it. In the past, the most impressive representations using 3-D display and animated "fly-throughs" required high-end GIS software. However, free software like Google Earth and Virtual Earth are changing that.

Implementing 3-D displays and animations provide a recognizable context for a discussion about where things are relative to other things. Other aspects are also apparent, such as size and scale. These are difficult to describe in words and depend on connecting with a common frame of reference in the audience. However, a virtual tour makes that context intuitive. The audience gets a sense for location, size and scale through visual observation, rather than interpreting words. And they have a little fun doing it.

Recently, we were asked to provide a virtual tour for a presentation to the Minnesota Senate Capital Bonding Committee. Typically, dignitaries like this would be given a tour to visit actual project sites, but the meeting would only last 2 hours and the project sites were widely distributed. The virtual tour idea came from upper management, since that approach had been used to great effect previously.

We selected Google Earth because we had used it in the past and were confident that we could meet the requirements. Previously, we had used Google Earth directly. That approach works well in a casual setting, where flexibility to look at various locations from various perspectives during the presentation is desirable. In this case, however, we decided that it would be better to record the "fly-through" sequences as video files to make the presentations repeatable, and to minimize the potential for problems during the presentation. For that purpose, we selected a software application called "fraps" (www.fraps.com). Fraps is popular for recording gaming sequences, is very inexpensive, and allows 60 second recordings at no cost.

The process involved adding data and imagery to Google Earth to enhance the data provided by default, recording clips of segments of the fly-through, and assembling the clips into movie files using MS MovieMaker (no cost). The clips were published on a temporary website so presenters could review them and comment on them for further refinement. Individual segments were refined until presenters were satisfied. Finally, movie files were assembled, including slides from PowerPoint and additional annotation from MovieMaker itself.

The presentations were made entirely using the movie files. The movies were simply paused when necessary, to focus on a PowerPoint slide, add emphasis or describe particular project details. The result was a very low cost, foolproof, high impact presentation.

Winter 2008 - Tech Talk: Planimetrics in ArcSDE

By Joe Sapletal, GISP

As we continue to migrate our databases to ArcSDE and our data storage procedures to ArcObjects, Python and Model Builder in ArcGIS we see an increase in the quality of data that we are able to provide to our users via ArcMap and our web applications.

You may have heard us discuss the dreaded "zinger". The "zinger" in *our* GIS dictionary is a rogue line that, while in the hands of the Photogrammetry Specialist, followed the slow curve of the curb and gutter around a cul-de-sac, but once in the ArcInfo database it quickly shot off in the wrong direction, seemingly one of its own choosing. Sometimes, as shown in the example to the left, it even happens to lines that appear to be relatively straight as well. In almost all cases, the "zinger" didn't appear in our quality control checks, but only in the ArcInfo coverage and the resulting shapefiles. Rather than spend time trying to fix the issue in ArcInfo coverages, we looked to see if ArcSDE would maintain the digitized lines through the new storage procedures.

Success! As you can see in the second example, ArcSDE was able to maintain the lines accurately, without "zingers". With that issue resolved, it was time to move forward with the next step. The goal was to create a process that would update the database as the Photogrammetry Specialist finished digitizing each PLS section, and then to replace all of the previously updated sections using the new procedure to rid the database of "zingers".

At this point you have probably figured out that the Photogrammetry Specialist does not edit our ArcSDE database directly. Edits are performed in MicroStation design files in square mile areas based on the Public Land Survey (PLS) sections. Once the edits have been done, all of the existing lines in that section are removed from the database, and the new and updated lines are then loaded into the database. To accomplish this task in ArcSDE, a Model Builder model was created.
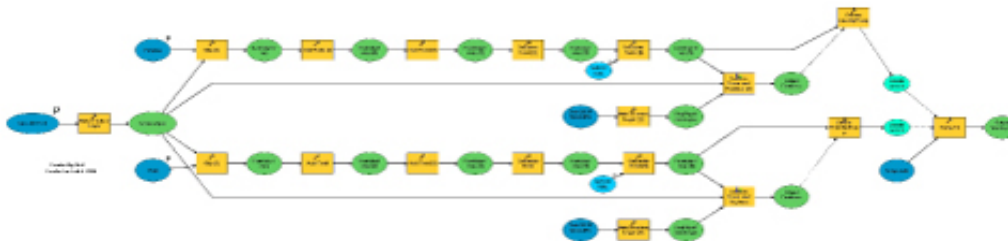
As you can see from the model above, the process of converting from MicroStation design files to features in an ArcSDE feature classes seems rather involved. But in actuality, all the process does is clip the section to be replaced from the feature class, then clips the data to be loaded into the section, and finally stores it in the feature class. The best part about using this model is its versatility. We can use it to create ArcSDE export files of the feature classes that hold our physical feature data for our partners who use ArcSDE and continue to provide shapefiles to our users as well.