

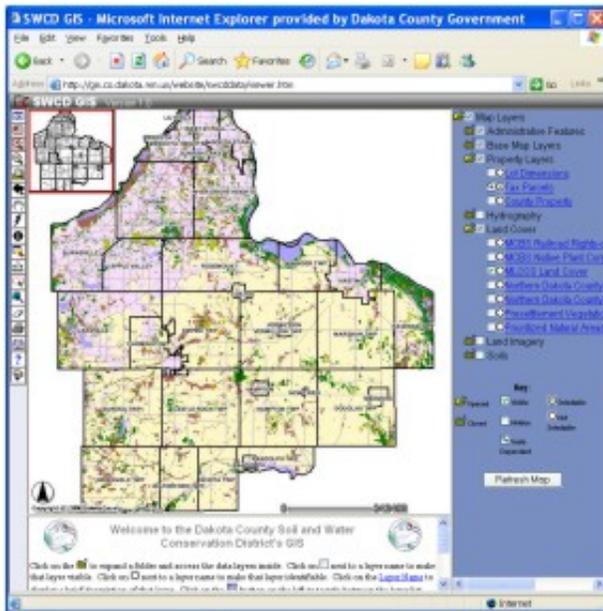
Winter 2007 Department Spotlight SWCD GIS

by Dave Holmen, Dakota County Soil and Water Conservation District

The Dakota County Soil and Water Conservation District (SWCD) has collaborated with the Dakota County Office

of GIS to produce an online mapping feature focusing on conservation-related information and historical aerial photography. This tool will allow the public to pan and zoom across the County while viewing commonly requested data such as land cover, soils, wetlands and aerial photography from 1937 to the present. Any landowner can use this tool to determine what type of soils occur on their property, whether wetlands may be present, or what their land may have looked like 60 years ago. From the SWCD website, citizens can print this information and maps from home.

Capitalizing on this technology will reduce office workload and increase efficiency by allowing interested individuals to access this information from their computer rather than traveling to the SWCD office to view maps and photographs. The online mapping feature, "SWCD GIS Version 1.0", will be available online at www.dakotacountyswcd.org in early 2007.



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Winter 2007 Desktop GIS: Introducing DakotaNet GIS 2007

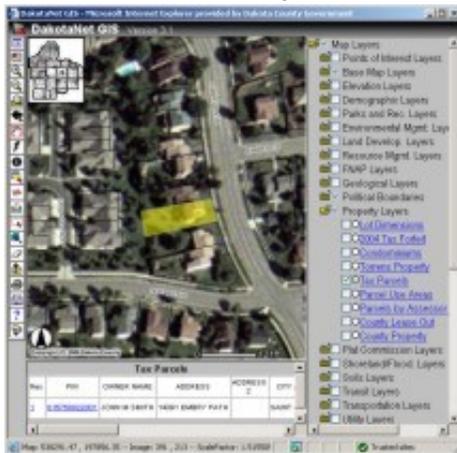
by Mary Hagerman

Are you familiar with Real Estate Inquiry? How about DakotaNet GIS? The Office of GIS has been exploring options for moving these applications forward with enhanced capabilities and current technology. Read on to see where web-based GIS at Dakota County is headed.

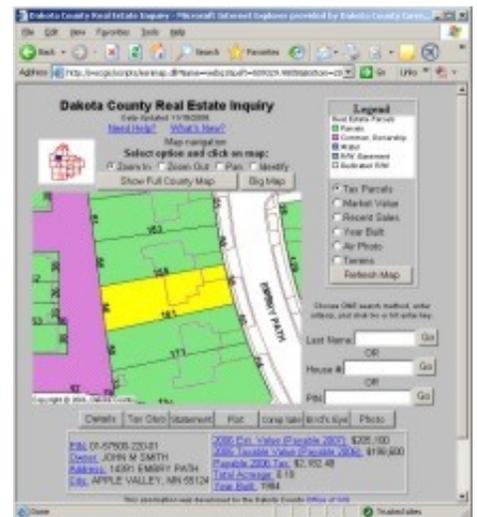
The Next-Generation of Web-based GIS

The Dakota County Real Estate Inquiry made its debut in 1998. Over the past decade it has become a heavily used tool, internally and externally, for accessing property information. It's efficient and fast, but it is built on software that is no longer supported. One day, it inevitably will simply stop working.

DakotaNet GIS was introduced internally just a couple of years ago. It has more features and provides access to more data than Real Estate Inquiry, and has attracted a good-sized user base. But the application is too slow to be released externally, and we have taken it about as far as we can without investing a good deal of development time. Yet, there is still more functionality that we would like to add.



DakotaNet GIS



Real Estate Inquiry

We need something new. The first thing we had to ask ourselves was, did we want to develop something in house, or purchase something we could use right out of the box? We found that our resources would go a lot farther if we leveraged work that somebody else has already done. We found an application we liked at a price we couldn't turn down.

Collaboration Makes the Deal Sweeter

There has been talk among the different counties in the Twin Cities metropolitan area of the need for a web application that provides a consistent user experience regardless of what county they are in. A common observation from residents is, "you can do it on Scott County's website," or "Dakota County has that on their website." In addition to differences in available information and services provided, each county's web mapping applications look and function differently. If the goal is to provide the public access to information, why make it so difficult? Why shouldn't the counties work together to provide the public with a consistent interface to county property information?

That sounds like a good idea, but putting it into practice proved to be difficult. Efforts to obtain a grant for a metro-wide collaboration project failed. However, Dakota, Scott, and Carver counties decided that collaboration was the right idea, so together they researched software packages. The vendor of the application chosen by the counties offered a significant multi-county discount. The three counties purchased the software together and forged an unprecedented partnership to work together. Working from a common application will allow the three counties to share their work and collaborate on further development efforts, effectively resulting in three times the development resources.

From Development to Deployment

With the new application in house, there are still a number of questions to answer before it is ready for 'prime time', so to speak. Should it be deployed internally or externally first? What will become of the existing applications? How will users receive it? What training opportunities should be offered?

At all three counties, it was agreed that the initial release would be internal. An internal release makes for a nice testing ground before going public, as it is a controlled environment and user reaction is easier to evaluate. Existing applications, at least at Dakota County, will remain as an alternative for users as long as there is a need.

In order for the collaboration to be successful, the new web-based GIS will have to get used. This will only happen if the application is useful and useable. To make sure this is the case, focus groups have been assembled to help guide the development. This input from potential end users will be invaluable to the success of the project.

Introducing DakotaNet GIS 2007



DakotaNet GIS 2007

DakotaNet GIS 2007, as this new web-based GIS is called at Dakota County, will provide all the same functionality and access all the same data as the existing version of DakotaNet GIS, including access to Pictometry imagery. Moreover, many features have been improved and there are a number of new capabilities as well. For instance, searching is faster and more flexible; there are more printing options, including the ability to specify a scale; and the measure tool now measures areas.

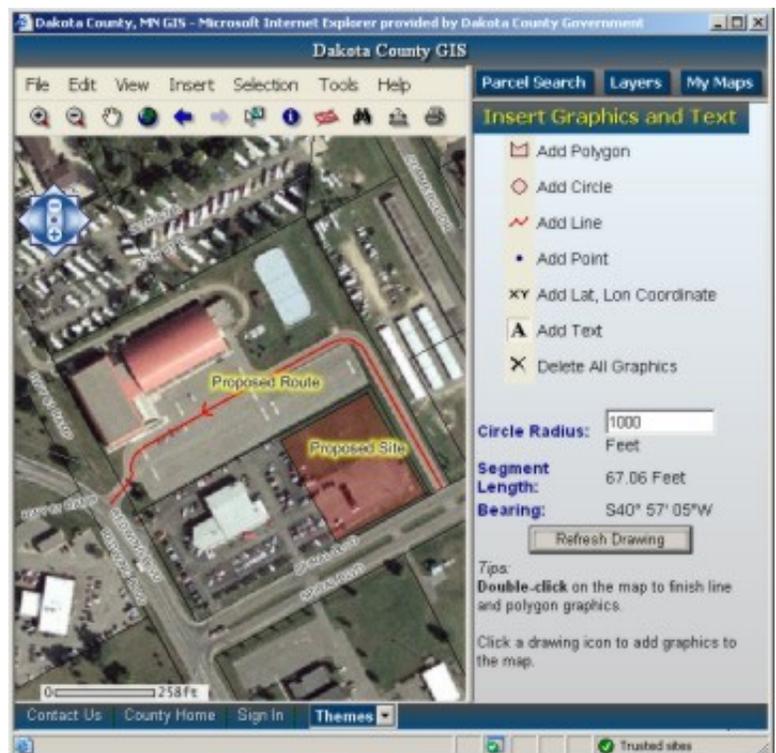
New features include the ability to create mailing labels or export data for selected features to an Excel spreadsheet. Also new is the ability to insert text and graphics on the map. The user can draw lines, circles, and polygons, add text, and even mark the map with coordinates.

There is a feature to

define preset 'themes', which will allow us to customize the application for specific groups of people. Selecting a theme will turn on and off certain layers pertaining to a particular groups' interests. On an individual level, layer settings can be saved, effectively creating a personal theme.

The Comparable Properties feature, similar to the comparable sales search in Real Estate Inquiry, will be interactive, allowing the user to determine the criteria used to select comparison properties. This feature will not be available in the initial release, however.

DakotaNet GIS 2007 is coming soon, so watch for it!



Add text and graphics to maps.

Winter 2007 GIS 101 What Are Contours?

by Randy Knippel

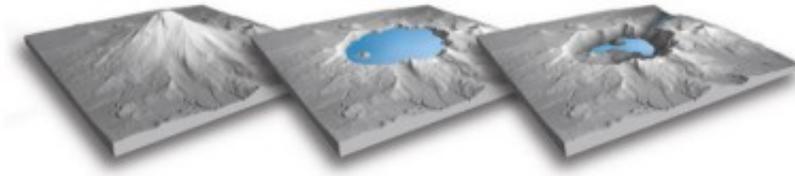
"Contours" are lines on a map that indicate what the elevation is. A single contour line represents a single elevation on the ground. Therefore, a contour line follows the same elevation around hills and valleys or encircles hills and depressions in the terrain. Contour lines are drawn on a map at a specific contour interval or change in elevation. "Index" contours are drawn every fifth or tenth contour to improve their readability, are usually the only ones labeled with the elevation, and are drawn with a thicker line.



Contour lines are drawn in brown. Index contours are thicker than intermediate contours.

Contours are used to represent a three-dimensional surface on a flat map. As you become more familiar with contours, you will be able to visualize the surface of the earth in your head and easily recognize where the terrain is steep or flat, rough or smooth. You will also be able to see landforms like hilltops, valleys, cliffs, and plains. You will then be able to use landforms as a reference, much like you would a street intersection on a roadmap. This can be very valuable when using a map for navigation in remote areas where there are no man-made structures like roads and buildings.

Historically, contours were drawn by hand on maps by cartographers. Today, using GIS, contours are drawn automatically using a computerized model of the ground or a digital terrain model. Cartographers can easily change contour intervals for different kinds of maps and can easily adjust elevation labels and contour symbols. However, the digital terrain model can also be used to create simulated three-dimensional views of the earth's surface and analyze that surface using sophisticated software tools.



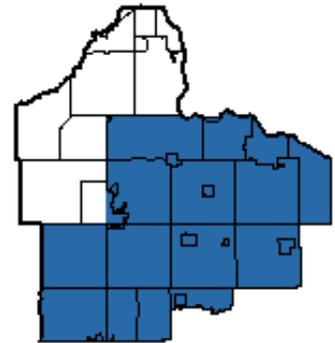
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Winter 2007 Tech Talk Contours from LiDAR Data

by Joe Sapletal, GISP

LiDAR has, in recent years, become a very popular and cost-effective way to collect surface data for the creation of contours. As anyone who has worked with LiDAR data knows, it can be a very dense dataset, so the big question is: how do you make contours that are useful from an accuracy standpoint and yet still look cartographically pleasing on a map? We did some research and came up with our process of choice.

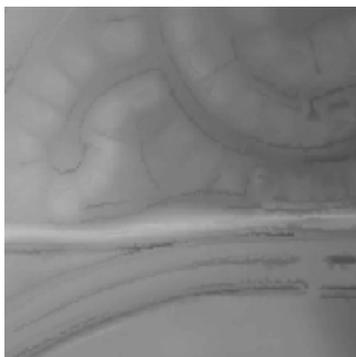
Our LiDAR data was originally acquired for a floodplain study, and the data was very useful to the engineers for that project. The new data was acquired because the existing surface data in the study area did not meet FEMA specifications. We had 10-foot contours in most of the floodplain study area, so we needed to acquire 2-foot, map-quality surface data. LiDAR was the most cost-effective choice for the 413 square miles of area we needed to update. Now our task is to make contours from the data for our GIS users.



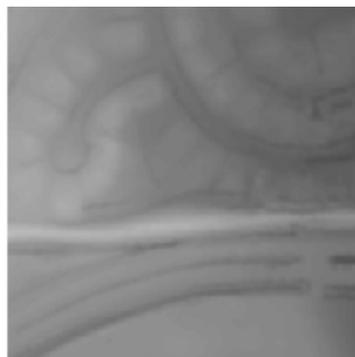
We ran across an article in our research from the April - June 2006 ArcUser magazine from ESRI titled [Creating Cool Contours, Modeling Glacial Terrain with ArcGIS](#). The article had a similar goal to ours - create a smooth contour set, one that is cartographically pleasing. So we tested it and modified it to our liking.

Our existing process consists of taking a Digital Terrain Model (DTM) of points and break lines, creating a Triangulated Irregular Network (TIN) from it, and then creating contours from the TIN. The contours created from this process are both accurate and cartographically pleasing (for the most part). They are more pleasing than the contours made using this same process while using LiDAR points, due to the fact that LiDAR data is more dense than the point data in the DTM. This is where the above mentioned article comes in handy. The key is the Focal Statistics command.

Our new process is - DTM (points are LiDAR); create a TIN; use TIN to Raster (to create a DEM); run Focal Statistics on the DEM to create a new DEM; and finally create a contour. You can see from the two example DEMs that by performing the Focal Statistics command (using the "circle", "4 cells", and "mean" options) you smooth some of the roughness created by the hard break lines in the original TIN.



DEM from TIN



Focal Statistics

From there we create two-foot contours. The resulting contours are useful from an accuracy standpoint and are cartographically pleasing. Contours made from the TIN from a very dense point data set and from the DEM from the TIN are very jagged. Jagged contours are not cartographically pleasing. As you can see in the example below, most of the jaggedness has been removed, leaving a cartographically pleasing contour dataset that is

representative of the area it represents.



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