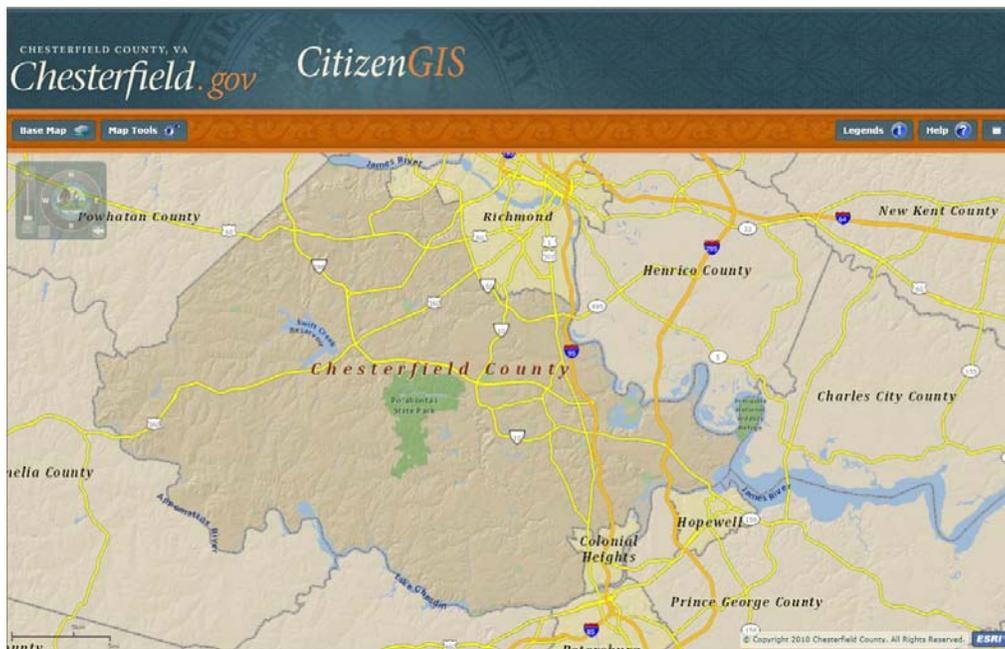


## Chesterfield County

### CitizenGIS Interactive Map Application

Category: Information Technology

<http://citizengis.chesterfield.gov>



### Abstract of the Program

The CitizenGIS application provides access to the Chesterfield County geographic information system (GIS) via a World Wide Web interface. The target users of the application are the county citizens and businesses who require a map of their property or information about county services affecting their property. The information contained within the application is not confidential in nature, nor is it specific to economic development or land development planning. It should be noted that those areas of interest do receive significant benefit from the implementation of this application. The project included the purchase of an ArcGIS Server staging license for the integration and quality assurance environments, in-

house development of the application interface, creation of the map services, and creation of the infrastructure to host the services.

The vision driving the development of this application was that the county's GIS data would be readily available from any computer having access to the internet. Citizens and businesses would have, at their fingertips, the necessary GIS information as needed for visual reference and visual analysis of conditions surrounding their homes or businesses. This would correlate into a reduced need for staff time to assist in creating and providing maps to customers, allowing staff to focus their time on other key activities.

By providing access to CitizenGIS, Chesterfield County has demonstrated an increased level of world class customer service, something the citizens have come to expect.

The application provides both cached and dynamic map services. The basemap cache is updated quarterly; the dynamic map layers are updated weekly. Twenty separate data layers are included in the dynamic map and an additional eight layers provide information in a textual format following a click on any parcel in the county. Three different years of aerial photography are included as alternate basemaps.

Map tools include a navigation tool, view map layers, measure & markup tools, searches, identify, print, a coordinate converter, a photo magnifier and bookmarks. Full screen mode is available for those who require a larger canvas for the map. Documentation in the form of tool tips, full help manual and legends are available on the Help tool. A return to the main Chesterfield County website is but a click away on the title bar.

Multiple search methods are supplied: by address, by GPIN, by Tax-id, by subdivision name, by pending zoning case number, by street name and by public point name.

### **The Problem/Challenge**

County citizens and members of the development community frequently required access to geographic data or maps that were available only at the county complex during normal business hours from 8:30 a.m. to 5:00 p.m. This was inconvenient for our citizens and customers as it required a special trip to be made to county offices. It also required a county staff member to spend time with the customer locating the correct area, adding the right layers to the display, and then creating the map product. If a hardcopy map product was the desired outcome, the customer had to purchase the map. Generally the process took about 20 minutes to complete. As the economy began to stagnate and staff recognized that citizens were forced to become more budget conscious, we recognized the need to create a more convenient and user-friendly method of accessing this information thereby unburdening our citizens and customers from driving to the county office complex and paying for a product.

### **Fulfillment of the Awards Criteria**

The development of this application provided the opportunity for innovative use of technology in that it is a first for Chesterfield County in many ways. It is the first application delivered directly to citizens with advanced graphical features. It is the first collaboration between the county's GIS and Architecture teams; the first application to utilize ArcGIS Server, Microsoft Silverlight 3, and IIS 7; and the first application to utilize two new enterprise scope web services. The application is state-of-the-art in terms of geospatial information delivery, and was developed completely in-house.

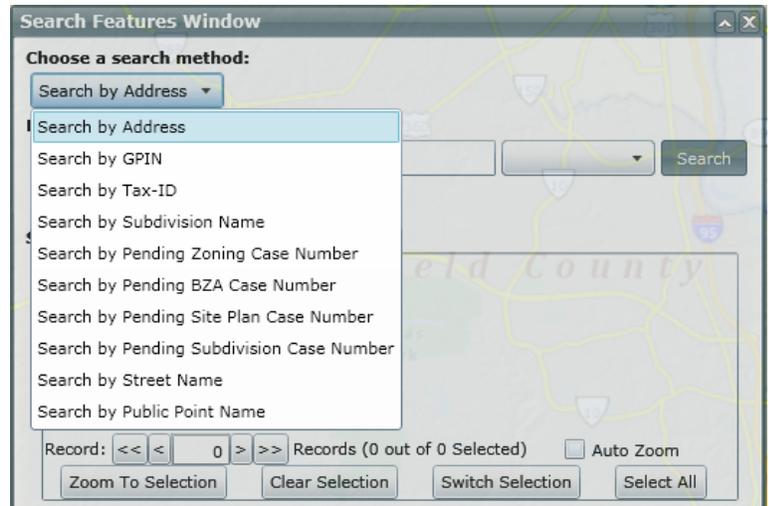
The application was developed in the Microsoft C# application development language using Visual Studio 2008. Project developers used the ESRI Silverlight Showcase application as a base and then customized it by adding six new user controls. Two new application scope web services were also created. The application consumes six different ESRI ArcGIS Server map services for viewing and querying.

The production environment infrastructure behind the application consists of an ArcGIS server and a web server. Both are PowerEdge M610 Blade Servers with an X5570 Xeon processor running Windows Server 2008 64-bit and IIS 7. An internal application server hosts the two enterprise web services consumed by the application. This is an innovative use of infrastructure, particularly a reverse proxy used as a gateway from the external web server to the internal ArcGIS Server.

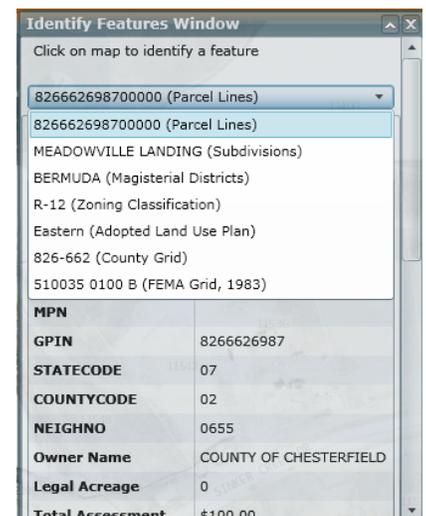
### How the Program was Carried Out

The development of the CitizenGIS application was guided by a Steering Committee made up of department directors and others with an interest in seeing the county's geographic data available on the Internet. In addition to county staff, several citizens also participated in reviewing the ongoing development to offer suggestions and insight into how citizens might

use the information that was being made available. The target user of the application was perceived to be the general citizen who is interested in obtaining quick access to information about or information affecting his property. Ten search methods were designed to cover most of the ways to access information.



Four styles of basemap were created to provide a variety of information. A plain basemap, shown on page one of this application, is available and in addition to it, three different years of aerial photography are available as background images in order to better see the surrounding area. Twenty



layers of information are available to be turned on or off when creating a map product or viewing data.

The identify tool provides a subset of assessment information about the property in question as well as providing an overview of related information about the parcel such as the subdivision name, magisterial district, zoning category, land use plan area, the county tile the parcel exists on, and the FEMA (Federal Emergency Management Agency) panel the parcel is shown on so the user can determine if the parcel is in a flood plain and requires flood insurance to be carried on the parcel or home.



A separate parcel click identify tool provides a snapshot of data about the individual property. This information comes from additional GIS data layers that are not included in the application as graphic data, but rather as textual data. Basic parcel information is provided with a hyperlink to the Real Estate Website, where all the assessment data can be found. This is followed by information about the schools, political and voting data related to the property.

The ability to print a map is provided such that three different sizes in two different orientations are available. The print map tool creates a portable document format (.pdf) file which can either be printed directly, or saved to the computer. The tool allows the creation of a customized



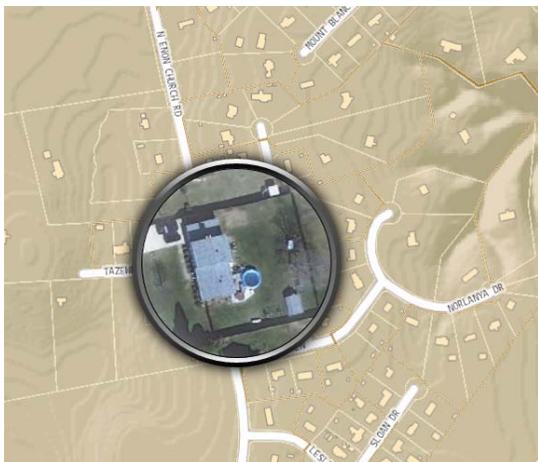
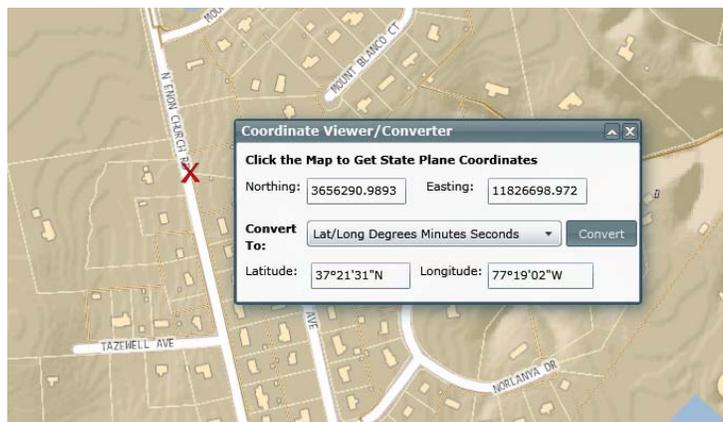
map title, and can be used with either the regular base map or with one of the aerial photography years.

Specialized tools including measurement tools, a coordinate converter and a magnifier were developed because the Steering Committee and citizen testers believed they would be valuable.



Measurement tools allow the measurement of linear distance or the calculation of area. This tool is useful in calculating the area of, say, a pond.

The coordinate converter is useful for transforming coordinates from the county's standard Virginia State Plane South Zone coordinates into either decimal degrees or latitude and longitude if the user needs to use a GPS unit or is doing some geocaching activities.



The magnifier tool allows the user to be zoomed out in the map, but to then magnify a parcel underneath and show the

aerial photograph view of the individual property even if that basemap is not currently in use.

The information contained within the CitizenGIS application is not confidential in nature, nor is it specific to economic development or land development planning, although it should be noted that both of those areas of interest receive some level of benefit from the application. Data within the Real Estate application was already available on the Internet; we now are able to link to it from the map.

The cost of the program was very modest in comparison to the benefit it has provided to the citizens and the land development community of Chesterfield County. All system development work was done by county staff so there was no additional cost of personnel or development time. Additional software licenses and two additional servers were purchased in order to accommodate the county's development environment standards and to maintain the security of the data once it was published to a public-facing environment. Total cost of the hardware and software required for the application was under \$25,000. Staff time for development was under 3,000 hours, which included time to meet with the project steering committee and the volunteer citizen committee which assisted in critiquing the application through its development. Development time was under six months.

### **Program Results**

Since being implemented in May of 2010, CitizenGIS met the stated business goal of providing open access to Chesterfield County's geographic data to customers from anywhere in the world. Web site analytics show that there have been site visits from all 50 states, the District of Columbia, and 76 foreign countries. The site receives an average of 173 unique visits per day. A process that once required a trip to the county government complex during business hours and at least 20 minutes waiting for a map to be processed, has been turned into a quick, easy experience at the customer's home or office. The average time a visitor spends on the web site is four and a half minutes! The site can be accessed, the information found via a variety of search options, and a map created and printed in less than five minutes. This open

access is provided 24 hours a day, 7 days a week at no charge to the citizen. As a result of this improvement in access and customer service, we have been able to re-purpose one resource who was formerly dedicated to staffing the map counter.

Both citizens and members of the development community have offered compliments about the site. Each comment references the wealth of information available. Several have mentioned that they use multiple jurisdictional mapping websites and that Chesterfield's is among the finest examples they have seen. A consulting firm that does GIS web site design for other jurisdictions has said that CitizenGIS is the best in-house developed site that they have seen.

The Chesterfield County school system has created a laboratory exercise based upon this site which is utilized by the high school Earth Science classes. The laboratory incorporates the appropriate standards of learning and reinforces those concepts. This lab would not have been possible had the schools needed to purchase individual software licenses for each computer.

A final area of success is the fact that the application was originally budgeted to use outside contractors to program the application. A substantial cost savings of nearly \$50,000 was realized by utilizing county staff to develop the application in-house.