

The City of Quinte West PRISM Program - An Emergency Notification System

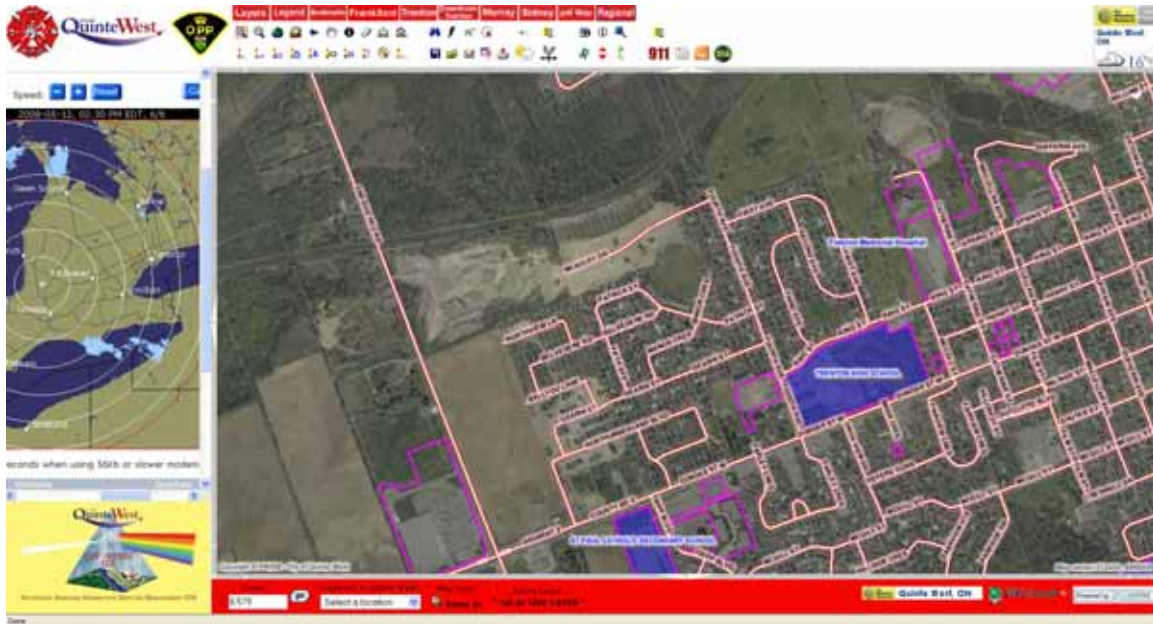
Authors: Steve Whitehead, B.A., GISP, GIS Coordinator
Ed Woods, B.Sc., Manager of Planning, IT & GIS Services

In October 2006, GIS staff of the City of Quinte West began building PRISM-GIS, a web based Geographic Information System for emergency management purposes. PRISM stands for *Protective Response Interactive Services Management*. A second and complimentary component of PRISM was later shaped, that being the telephone emergency notification system known as PRISM-911. Ultimately, the two components are intended to enhance the capacity of Quinte West emergency response personnel to be more efficient and make the City safer for citizens and businesses.

PRISM-GIS is a web-based application that leverages the City's existing ArcIMS (ESRI), ArcSDE GIS (ESRI), and GeoCortex IMF (Latitude Geographics, Victoria, B.C.) framework. Prior to 2006, the City had already successfully deployed web based GIS sites to City staff and a community GIS site to the public. As such, it was a logical step to create a GIS site for emergency management. PRISM-GIS gives emergency personnel access to a robust mapping system in the field. The command centre at City Hall also has the ability to run the application, manage City resources, and deliver maps and information to emergency staff. The web GIS applications are housed on a server at City Hall and are maintained by the GIS Division.

Emergency personnel can access detailed floor plans of schools, retirement homes, commercial buildings and other major buildings that are hyperlinked to the map. PRISM-GIS contains ownership information for every property in Quinte West, including digital elevation models, one metre contour elevations, and high resolution orthophotography from 2002 and DRAPE imagery from 2008. Previous to this, staff had to locate hard copies of floor plans and request printed copies of maps. Further, the City of Quinte West Fire Department maintains the "Fire Response Times" layer, which is a series of points spread throughout the City with each point listing the response time for each of its seven fire stations. Other important layers on the PRISM site include City Services (water, sanitary, fire hydrants, traffic lights, etc.), flood plain lands, and various base mapping layers from the Ontario Geospatial Database Exchange.

GIS staff developed a regional mapping component which incorporates live precipitation radar images, as well as other useful geodatabases such as hospitals and airports and transportation networks. The road network is being incorporated into the PRISM regional map as live data from Land Information Ontario (Ontario Ministry of Natural Resources) in the form of a web mapping service (WMS) layer. One of the most significant capabilities of PRISM is that it provides map-based interaction via map sketching so that users can communicate real-time information about accident sites, evacuation routes, road closures, staging areas, helicopter landing sites and triage areas. PRISM also allows for "the saving of sessions", so that staff can save their maps as events occur providing an historical record of events during an emergency. Distances, approximate travel time calculations between sites, and area calculations are easily performed with the tools in PRISM. PDF maps can be created with a click of a button, saved and e-mailed instantly.



In the fall of 2007, City GIS/IT staff developed a live communication tool for PRISM using Microsoft's *Live Meeting* application which allows Central Command direct communication with emergency field staff. This means that maps and information displayed at the command centre can also be viewed by staff using wireless laptops.

Staff has also configured a municipal web-based Emergency Response Guide (ERG) that gives the user the ability to connect instantly to the most updated version of the ERG while in the field during an emergency. The 2008 Emergency Response Guidebook was developed jointly by Transport Canada (TC), the U.S. Department of Transportation (DOT), the Secretariat of Transport and Communications of Mexico (SCT) and with the collaboration of CIQUIME (Centro de Información Química para Emergencias) of Argentina, for use by fire fighters, police, and other emergency services personnel who may be the first to arrive at the scene of a transportation incident involving dangerous goods. Where seconds can be crucial in resolving or responding to an emergency, this is invaluable.

Based on the ERG for chemical spills, the City of Quinte West GIS and IT staff developed a Table of Initial Isolation and Protective Action Distances (TIIPAD) tool that maps isolation and evacuation areas. This tool collects important information including material spilled, time of day, wind direction, size of spill, and plots the required evacuation area to the PRISM map. Previous to the development of TIIPAD, emergency response staff would have to sketch on a hard copy map or estimate the evacuation area based on the hard copy version of the ERG.



In 2007, Quinte West Council directed staff to investigate the possibility of implementing a public emergency telephone notification system. This request followed a series of boil water advisories that involved a significant amount of manpower and were very time consuming. City personnel had to physically travel door-to-door to ensure that all affected residents were advised. After researching various emergency notifications systems, City GIS and IT staff concluded that it was a logical advancement to further develop PRISM-GIS into a geospatial telephone emergency notification system.

After securing \$57,000 in Federal funding through the GeoConnections Program in 2007, the City further developed specific components of PRISM-GIS and implemented PRISM-911 in cooperation with their project partners ESRI Canada, Land Information Ontario (Ontario Ministry of Natural Resources) and Emergency Management Ontario. GeoConnections is a national program initiative led by Natural Resources Canada that helps decision-makers use online location-based (or 'geospatial') information, such as maps and satellite images, to tackle some of Canada's most pressing challenges.

PRISM-911 automatically calls the telephone numbers that were generated geospatially during an emergency. The GIS permits the creation of custom geographic areas such as a specified radius, a sketched polygon (for example a neighbourhood), or a TIIPAD chemical spill plot. VoiceGate's Emergency Response application is the dialing engine which is used to send out prerecorded emergency phone messages. The system provides the City with the ability to contact its citizens quickly and efficiently during emergency situations such as a chemical spill, fire, train derailment, boil water advisory or missing child report.

PRISM is also offering a service to residents who may require special assistance in an emergency. This feature called PRISM-Care is a layer within the system that maps out these residents and a listing can be provided to emergency officials quickly, providing the conditions of the residents in need and their locations. Emergency responders can be sent directly to help these people.

PRISM IN ACTION

In January 2008, a boil water advisory was issued for the residents of Batawa, a hamlet within the City. The application notified over 100 area residents of the advisory and then again when it was lifted. As this boil water advisory was issued while PRISM-911 was still under development, City staff were also dispatched to each home simultaneously as the messages were being called out. By March 2008, PRISM-911 was fully functional, including several built-in security features. The system was again activated in the summer of 2008 during another boil water advisory for Batawa. The procedure to call out to residents was completed in 15 minutes.

In April of 2008, PRISM-GIS and PRISM-911 were activated for a flood warning along a portion of the Trent River in Quinte West. The City quickly mobilized the system to notify its residents located in or near the flood plain of the warning. The flood plain area was delineated in PRISM-GIS, and a recorded telephone message was sent to over 700 hundred residents along 32 kilometres of the Trent River. The procedure to call out took approximately one hour.



CHALLENGES

The collection and maintenance of telephone numbers may have been the most daunting task of the process. According to Quinte West Manager of Planning IT & GIS Services, Ed Woods: "We started with one phone number and that was our own. From there we built a database of over 14,800 telephone numbers. Quinte West staff utilized Canada-411 to input the phone numbers of all residents and businesses in Quinte West. The initial process of populating the database took one staff member 3 months. As the system is only as good as the telephone database it uses, we needed every residential, commercial, industrial and institutional phone number in Quinte West. We also actively requested cell phone numbers and any unlisted phone numbers."

Newspaper and magazine articles as well as radio news reports have promoted the need for the public to submit their telephone number to the PRISM system. The public can also use the online registration form on the City's website or forms provided at city facilities to add their numbers to PRISM.

GIS staff have mapped out properties that still require telephone numbers and have made this available on the city website. PRISM registration sheets have been mailed out to many of the properties that have been identified as not having a phone number in the database. GIS and IT staff continue to work on developing new methods of keeping this database up-to-date, and identifying new landowners moving into the city. It is estimated that the telephone database is now 95% complete.

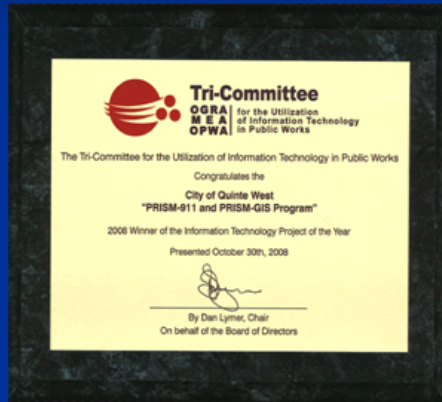
PRISM is not limited to being activated on regular working hours. With the flooding of the Trent River in 2008, GIS and IT staff had to address the issue of making PRISM a true 24/7 service. The swollen Trent River became a threat to 700 residents along a 37-kilometre stretch. It became apparent that notifications might have to be sent on the weekend of a full emergency, so staff configured PRISM to be accessible remotely from outside City Hall. Now staff can do the GIS work, record the messages and initiate the phone calls from anywhere, any time. PRISM-911 is now a full 24/7 municipal service available to City officials, the Fire Department and the Quinte West division of the Ontario Provincial Police.

RESULTS

The City of Quinte West reached the goal that Council initially set out to accomplish at the beginning of 2007. In May 2008, The Association of Municipal Managers, Clerks and Treasurers of Ontario (AMCTO) recognized the City of Quinte West with the E.A. Danby Award for Municipal Administration (Municipal Population 20,000 or more) in recognition of the program, and in September 2008, the City received the Tri-Committee of Ontario's "2008 IT Project of the Year Award".

The PRISM Program is the first Canadian made emergency response application of its kind in the Country. PRISM has been used by City officials on six occasions since January 2008. The City has saved tens of thousands of dollars by utilizing PRISM instead of more traditional forms of notification (i.e. City staff going door to door) that is also very time consuming and less efficient.

Winner of the Tri-Committee of Ontario IT Project of the Year



The City of Quinte West PRISM Program was the recipient of the Tri-Committee of Ontario second annual IT Project of the Year.

The Tri-Committee of Ontario consist of members from Ontario Good Roads Association (OGRA), The Municipal Engineers Association (MEA), and the Ontario Public Works Association (OPWA).

THE FUTURE

Having implemented a functioning system for the residents of Quinte West, the City is now looking to the future. One of the advantages of a web-based system is that there are no limits to the enhancements and potential inter-jurisdictional co-operation that may be possible. The City is currently planning to expand the number of telephone lines available for PRISM. This will significantly improve the speed of message delivery.

In addition to this, the City is in the process of developing and testing the concept of a PRISM-Network where resources can be shared amongst municipalities in order to decrease callout times. The potential benefit would be that the time required to complete an emergency call out campaign could be reduced with access to additional resources like telephone lines.

Example Scenario:

The City of Quinte West needs to notify 3,000 homes of a Boil Water Advisory in the Trenton Ward. The 16 port PRISM VoiceGate System, executing 1 call per 1 minute, will provide 960 calls per hour for an approximate total time of 3.1 hours.

If the City were to network with other municipalities the notification time could be greatly reduced. For example, 64 ports executing 1 minute per call would give an approximate call time of 47 minutes.

With respect to cost, long distance calls for PRISM for municipal governments range between 3 and 4 cents per minute. Therefore, if 75% of the 3,000 calls in this example were long distance, the total cost to Quinte West for the PRISM callout would be between \$70 - \$80.

With PRISM, city staff can now activate a call out campaign within 15 minutes of receiving notification of the emergency. The entire process can be activated remotely from wireless laptops and is available to City officials, the Fire Department and the Quinte West OPP as a full 24/7 municipal service.

Summary

Now up and running, PRISM has enhanced the City's capacity to keep its residents informed and safe during an emergency. When the City needs to alert the public it can now do so in a timely and efficient manner and can quickly focus on specific areas or neighbourhoods.

City officials are also offering a direct notification to the media, through which all registered media outlets will also receive a email message that a PRISM call out is occurring.

Finally, in effort to tackle its most significant challenge, PRISM has made over 27,700 phone calls from its' PRISM-911 telephone database to verify the accuracy of the database. This process, called PRISM Verification will occur annually between January and March which will see the PRISM system call residents and businesses in Quinte West to verify the PRISM-911 database. PRISM Verification has been an excellent success with over 75% of the database being verified by the Public.

The PRISM Program will be introduced in 2009 to the County of Huron where it is schedule to launch in November. The PRISM Program is a municipal administration application developed by a municipality for municipalities.

About the Authors

Ed Woods is the Manager of Planning, IT & GIS Services in the City of Quinte West, a municipality of 43,000 located in Eastern Ontario. Mr. Woods is a graduate of Waterloo University (1986) with a Bachelor of Environmental Studies (Honours Urban & Regional Planning). Mr. Woods was the Manager of Planning for the Township of Murray for nine years. After amalgamation in 1998, Mr. Woods became the Manager of Planning for the City of Quinte West. In 2006, Mr. Woods was promoted to Manager of the IT/GIS Service department with a team of six (6) IT/GIS staff.

Steve Whitehead is the Geomatics Coordinator at the City of Quinte West. He is a graduate of Carleton University with a Bachelor of Arts in Geography. He is a certified GIS Professional and a member of the Canadian Institute of Geomatics. Steve has over 15 years of GIS experience in the municipal and conservation sectors. He has been the Geomatics Coordinator for 10 years and has worked extensively on developing web based GIS applications at the City.

City Website: www.city.quintewest.on.ca

PRISM page and video: <http://www.city.quintewest.on.ca/prism/prism911.htm>

For more information, please contact:

Edward S. Woods, B.E.S.

Manager of Planning, IT & GIS Services

City of Quinte West

(613) 392-2841

edw@city.quintewest.on.ca