



King Fahd University of Petroleum and Minerals

College of Environmental Design
Architectural Engineering Department

Introduction to Geographic Information Systems

Term Paper

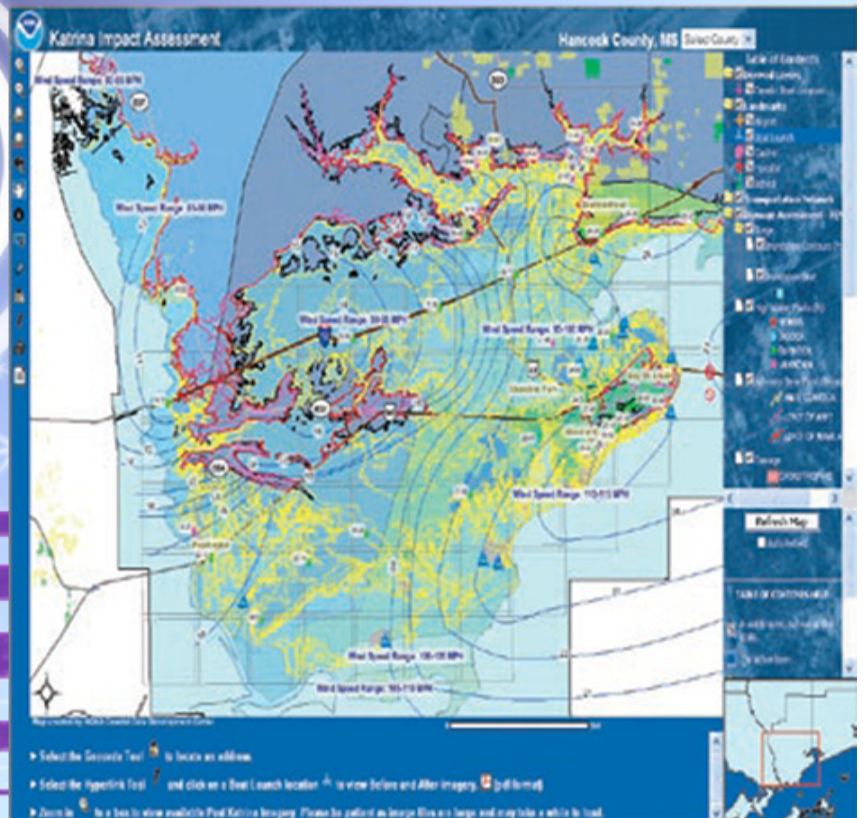
GIS Solutions for Business Continuity Planning

Prepared by
Saleh Ahmed Binlswad

Submitted to

Dr. Baqer Al-Ramadan

January ,2011





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ARC 514 Introduction to Geographic Information Systems

Term Paper (GIS Solutions for Business Continuity Planning)

Supervision : Dr. Baqer Al-Ramadan

*Preparing : Saleh Ahmed Binlswad
G200804380*

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1. Introduction

1.1 Background

The main goals of any facility managers in business organization is to improve his organization in all sectors . To achieve these goals they have to use the new technology and make it to interact during doing their tasks. Geographic information system (GIS) technology combines mapping software with database management tools to collect, analyze, organize, report, and share many types of information. Different data sources and data types are linked using the location at which the data is collected or its association to a place or address. A GIS can link to and access information that is shared from the field or read from a departmental database anywhere on the network. In addition, time-critical information collected by real-time sensors and broadcast from notification systems can be combined to improve situational awareness.

1.2 Statement of the problem:

Time and money are very important in the business organization . Furthermore increases the competition between the organization and huge growth of them in a rapidly changing world requires use and implements a new technology to go up . One of the new technology is GIS which provide many service to help business organization to expansion their business , control the employees and provide a high level of users satisfaction .

1.3 Research Objectives

The main objectives of this study are:

- 1- To provide the main requirements for GIS to provide planning service.
- 2- To develop GIS Strategic and Implementation Planning.
- 3- To provide The role of GIS in Business Continuity Planning.

1.4 Significance of this study

The importance of this study comes from the facts that :

1. Using technology to development the rise growth of business organization in a
2. rapidly changing world.

3. Help facility managers to easy control and distributes their facility and employees.
4. Also it will help them to manage these affects or changes through the lifecycle of building .
5. Save time and money during the planning procedures and activity in these type of building.
6. Develop the productivity , function , and the performance of these organization.
7. Provide high level satisfaction for users in terms of how they gets their service and requirements.

2. Literature Review

2.1. Business Continuity Planning

2.1.1. Definition :

Business Continuity Planning can be definite as the holistic management process that indentifies impacts that threaten an organization and provides a framework for building resilience with the capacity for an effective response that safeguards the interests of key stakeholders , reputation , brand , and value-creating activities.

2.1.2 Geographic Information Systems (GIS)

is a sophisticated decision-support tool to help professionals working in business and economic development. It is a computer database management system designed to collect, store, retrieve, manipulate and display spatial and tabular data in the form of digital maps and overlays. In essence, it takes statistical information and puts it into a visual format.

2.1.3. Building a comprehensive Business Continuity Plan :

A comprehensive Business Continuity Plan in public or private building can highlight it in the following :

- Analyze business workflow and involve key department (Compliance and operation , Corporate communication , Employee relation , Executive management , Human recourse , It , and Legal)
- Assess risk and identify mitigating strategies.
- Develop strategy and create response plans.
- Communicate the BCP to staff , then rehearse.
- Refine the BCP through the identification of weakness in lines of communication and the decision making process.
- Implement operation redundancy where appropriate for mission –critical services.
- Establish backup or off- site facilities for data storage .
- Advise key clients , suppliers ,and partners of the BCP and their part in its execution.

2.2. GIS requirements and Strategic

2.2.1. GIS project requirements

In any organization that are dealing whit GIS application there many kinds of GIS project needs to make it successful. The managers , staffs , and operational practices are focusing to fit the business and program requirement . when , they want to establish a new business or develop the existing system they have to evaluate it . For any GIS project or application , there are two kinds of needs must be concern . There are technology needs which include date , software , hardware , network, application and standards . other kinds of requirement are organization needs which include best management , best coordination , staffing satisfaction , policies and partnerships.

2.2.2. GIS Strategic and Implementation Planning

There is different between GIS strategic and implementation planning . GIS strategic contain many component which include create a vision for information technology , define high level goals to develop an existing business or establish a new one , identify an internal and external stakeholders , determine the main objectives or initiative , define Business case , identify general timing and high –level GIS estimates cost.

However GIS implementation plan activities include provide project description and objectives , identify the main tasks , determine specific milestones and deliverable , provide schedule and timing constraints , reorganize cost estimate , budget and resource , definition of roles and control management and communication procedures

3. The Role of GIS in Business Continuity Planning

3.1. GIS as a sources for identifying appropriate site to move to

There are a number of reasons for a site search which include the present site is inadequate, the company is expanding into a market area , operations are being decentralized , the company is relocating to an area adjacent to an existing or new source of raw materials , operations are being consolidated at a new location , the company is relocating to an area where specialized and skilled manpower is available and economics factors.

According to above reasons when the decision was to move to a new location the facility manager have to study all solutions available to move to , GIS help them to fit physical site requirements which include Size of property, acres , Transportation services (Waterways, Railroads, Public transportation, Airport) , City water (For domestic use , For fire protection)

Also , GIS can provide information about:

- Where are my customers and where should I put new facilities?
- Who does an emergency impact?
- How will a power outage affect my operations?
- What is the impact of new urban development?

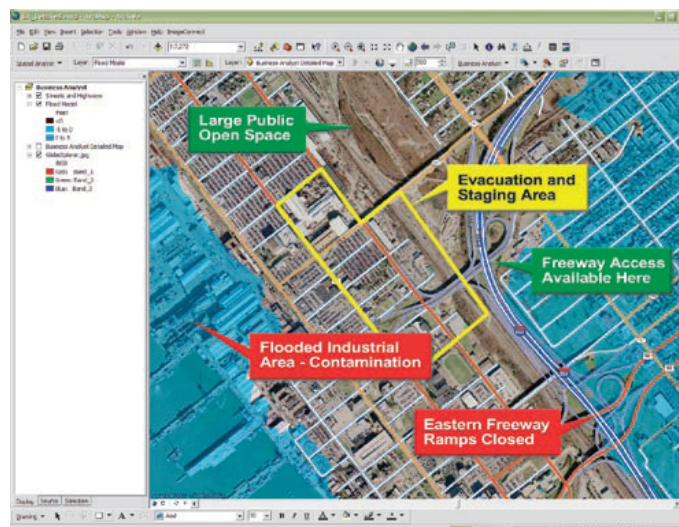


Figure 1. Identify different types of business area

3.2. Identifying Markets

An important aspect in business is the identification of a target market or "customer mapping." By using geography and mapping potential customers, those looking to identify their market can find the highest concentration of the best potential customers. GIS allows this mapping to be completed in an efficient manner and maps created with this tool can have color-coding to identify customer concentrations.

For example, if a children's clothing store is considering relocation because it is not doing the ideal amount of business the store could map the population of people with children in its target age group throughout the city or area it is considering moving to. The data can then be put into a GIS and mapped using dark colors for the highest concentration families with children and lighter colors for those without. Once completed, the map will highlight the ideal areas for the clothing store to locate based on that factor.

3.3. Determining if a Service is Needed

Like customer mapping, it's important to businesses to locate where a service is needed to get the best possible sales numbers. Using mapping allows various types of customers to be easily identified to see if an area needs a business or service.

Take for instance, a senior center. Because this is a specialized service it is important for it to be located within an area with a high proportion of senior citizens. By using customer mapping like in the children's clothing store example, the highest proportion of senior citizens in a city can be easily identified. Therefore, the area with a greater senior population would need this service more than another without that age group.

3.4. Identifying Other Services in the Same Area

Another problem that sometimes occurs in business is the location of two types of service in the same area. Often one can drive another out by taking its customers and/or users (in the case of the senior center). For example if there is already a bookstore in a downtown

area, a new one should not open on the next corner over unless there are enough customers to support both.

With business geographic all businesses or services of a certain type in a city can be mapped. By using GIS, the target customers can be put on top of a layer showing current bookstore stand locations for instance. The result would be the ideal location for a new stand.

3.5. Analyzing Sales

Business geographic also helps businesses to analyze the geographic patterns in their sales. In identifying these patterns, business managers can see certain areas where people buy various products. This is important because the peaks of say, black coffee as opposed to coffee with cream, might not be recognizable any other way. By identifying such peaks through the sale of different items at several coffee houses in a chain, the manager of the chain can determine which items to carry at the different locations. In doing so, business for the chain can become more efficient.

3.6. Marketing Plans

The applications of business geographics listed above (minus site selection) all aid in the creation of marketing plans as well. Once a business is built, it is important to be able to advertise to its target market in an efficient manner. By using GIS and mapping to first identify an area's market and the customers within it, the products offered by the stores can best match demands specific to that market area.

The efficient sale of products and offering of services to the population is an important part of the world's economy. By using business geographics, those in charge of the task of locating businesses and selling such goods are doing this in the most efficient way possible. In using maps, businesses managers are also reinforcing the notion that maps make excellent graphical tools.

3.7. Stay connected

Every organization or business has many branches or chains which are located in different places . Using GIS to show location of asset lets BCP analysts and evaluate them . Also , see what are the main implication of it . by doing that they can provide many solutions to develop their business such as change the location . However if the indicators show high customer pursuers , they will think to expand their businesses . they will use GIS to identify many options of new location .

3.8. See Your Company

GIS can provide a visual snapshot that shows where assets and employees are located. It will help the facility managers to control them easy . for example he can distribute the staffs and exchanges the roles between them. Through GIS-based dashboard-type applications, managers can quickly obtain a high-level overview of a situation and understand what needs to be done to reestablish critical business functions in the event of a disruption.

3.9. Relocate Operations

Every BCP must address the relocation of personnel, operations, and assets. In some industries, specific rules govern what must be included. GIS is well suited to relocation analysis, allowing BCP analysts to factor in locations of the company's most critical employees from a day-to-day operations perspective and determine a temporary operations site that is accessible and optimal in relation to these employees.

3.10. GIS as technology tool for planning and programming facility change

By using GIS , can provide a better managing change by indentify the main location for the market they work in , the product they deal with , the technology available to do their jobs and the activities they under taken . Also , can provide a better communication change which an important of the processing change.

3.11. Enterprise GIS Integrates Business Continuity Operations

Build a Foundation to Support All Your Departments

An enterprise GIS is an integrated, cross-departmental resource composed of interoperable components that support all aspects of the business continuity mission. It provides broad access to geospatial data and analysis through a common standards-compliant application architecture.

There are many benefit could gain which include :

- Improved collaboration and communication across command, control, and response teams
- Reduced data redundancy coupled with improved accuracy and management integrity of geographic information
- Increased ability to analyze and respond to events as they unfold by using a single, common view of the field of operations
- Improved analysis, visualization, and decision support
- Common operating views to understand areas of business risk as well as business opportunity.

4. Business Continuity Post disaster

A BCP that is tied to a community's disaster management strategy will allow for a quick recovery of the community as a whole, meaning the public, private, and citizen sectors are collaborating toward a common goal of resuming normal operations. Without a proper business continuity plan, a natural or man-made disaster can compromise a community's ability to do business, thereby impeding the response and recovery process. The speedy recovery of commerce can mitigate the effects of a disaster by reestablishing civic quality of life within the community.

4.1. Surviving the Next Pandemic (Case Study)

Protecting Employees, Maintaining Operations, and Serving Customers

Description of the statement :

The SARS epidemic of 2003 reinforced the importance of planning for local disease outbreaks. More recently, government health authorities have been warning the business

community that an influenza pandemic will occur at some point in the near future, as they have in the past (1918, 1957, and 1968).

Businesses are developing specific plans regarding how they will protect their employees, maintain operations during a pandemic, and anticipate changes in consumer behavior.

The role of GIS

- Understanding locations of health risks
- Predicting hospital capacity shortages
- Locating vaccine/antiviral delivery sites
- Identifying employee households at risk

A pandemic will impact different business locations at different times. GIS enables informed decision-making regarding how the geographic spread of disease is impacting employees, operations, and customers. Executive dashboards can be built using real-time news feeds and notification systems. Using the latest information from public health authorities and other sources, any business can understand the impact of the pandemic on their organization, suppliers, and employees.

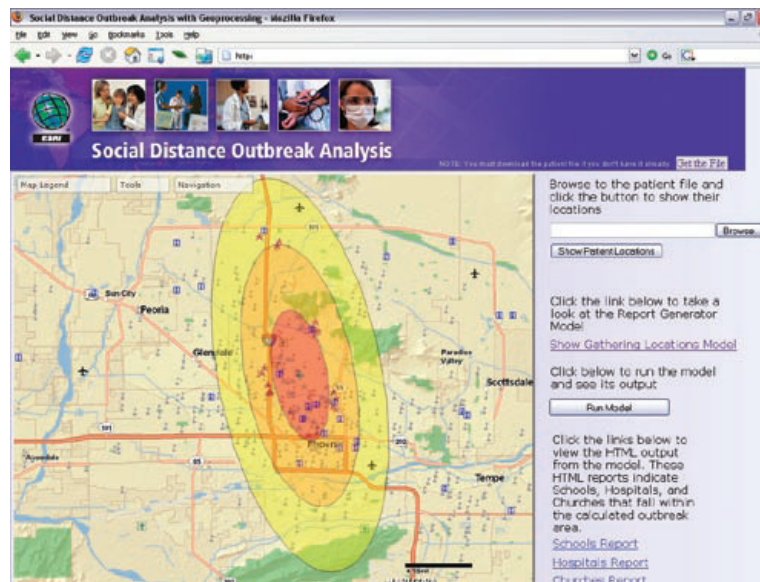


Figure 2. Identify health risk

4.2 Southern Company Turned the Lights Back On after Hurricane Katrina with the Help of ESRI A “Stay Connected” Case Study

Description of the company :

Southern Company, a super-regional energy company and one of the largest producers of electricity in the United States,. All five operating companies of Southern Company—Alabama Power, Georgia Power, Gulf Power, Mississippi Power, and Savannah Electric.

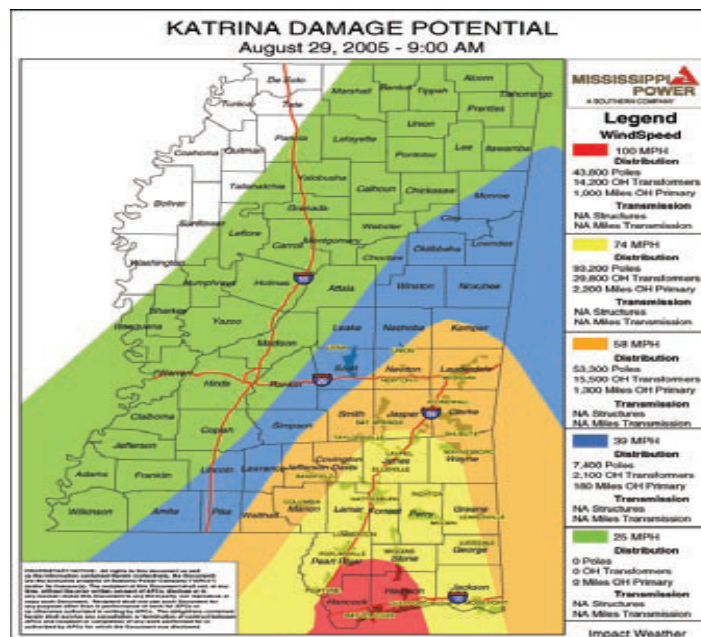


Figure 3. Identify location of producers of electricity in the United States

The Role of GIS

- 1- It relies on the ArcGIS integrated family of GIS software to run its business
- 2- Use GIS across the enterprise for analysis, visualization, and decision support.
- 3- By relying on its GIS, Southern Company was able to respond quickly to Hurricane Katrina, which wiped out all the power to Mississippi Power Company's 195,000 homes and businesses in 23 counties. In only 12 days, Southern Company restored service to all customers whose homes and businesses were not destroyed.

- 4- They used ArcGIS extensively during the storm. They are being able to coordinate the more than 9,000 people we had working. they were able to put our staff to work efficiently and provide management-level data virtually on the fly.

4.3. City of Portland, Oregon (Case Study)

With a population of over 500,000, Portland is Oregon's largest city. The city has used GIS for many years, but in the last 5 years it migrated to an enterprise GIS structure. The GIS staff estimates this has saved the city \$9 million by reducing duplication of system, software, staff, and other related cost items.

The enterprise GIS enables fast and easy access to data and system resources, which continuously contributes to better support and more informed decision making by city staff and city leaders—an important return on investment.

The successes of the enterprise GIS have laid the groundwork for enhanced data sharing with external agencies and businesses, which city staff anticipates will yield additional cost savings and other benefits for residents of the region.

4.4. Apex Office Supply Delivers No Matter What the Weather Is

A “Keep It Simple” Case Study

Description of the company :

Apex Office Supply is a small office supply company based in Vinton, Iowa. The company, created in 1986, serves east central Iowa, which has a population of approximately 300,000 and includes two major cities, Waterloo and Cedar Rapids. Apex Office Supply brings services and products to 1,500 active customers and has a delivery radius of approximately 45 miles. The company runs five routes and makes approximately 200 deliveries a day.

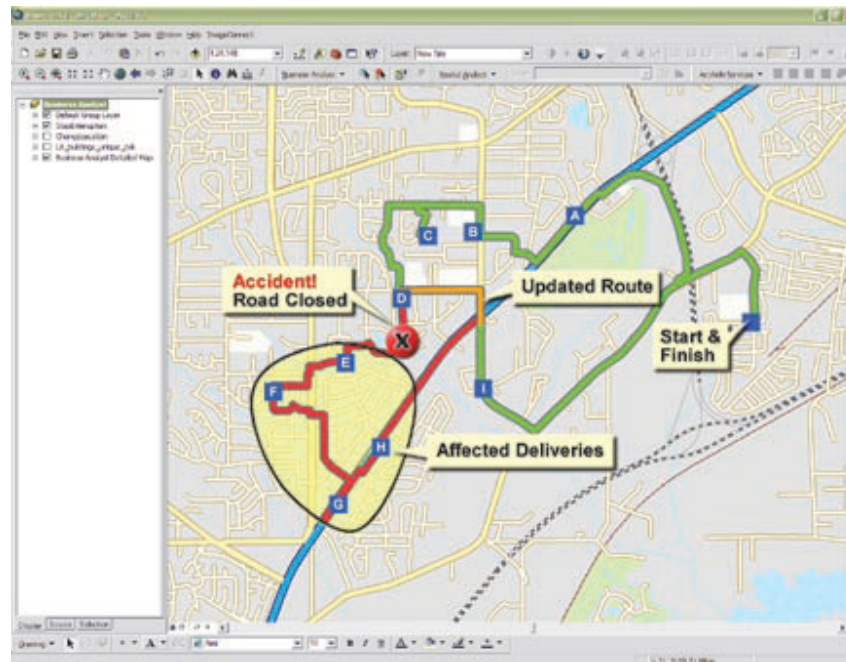


Figure 4. Creates right routes for Office Supply Deliveries

The Role of GIS

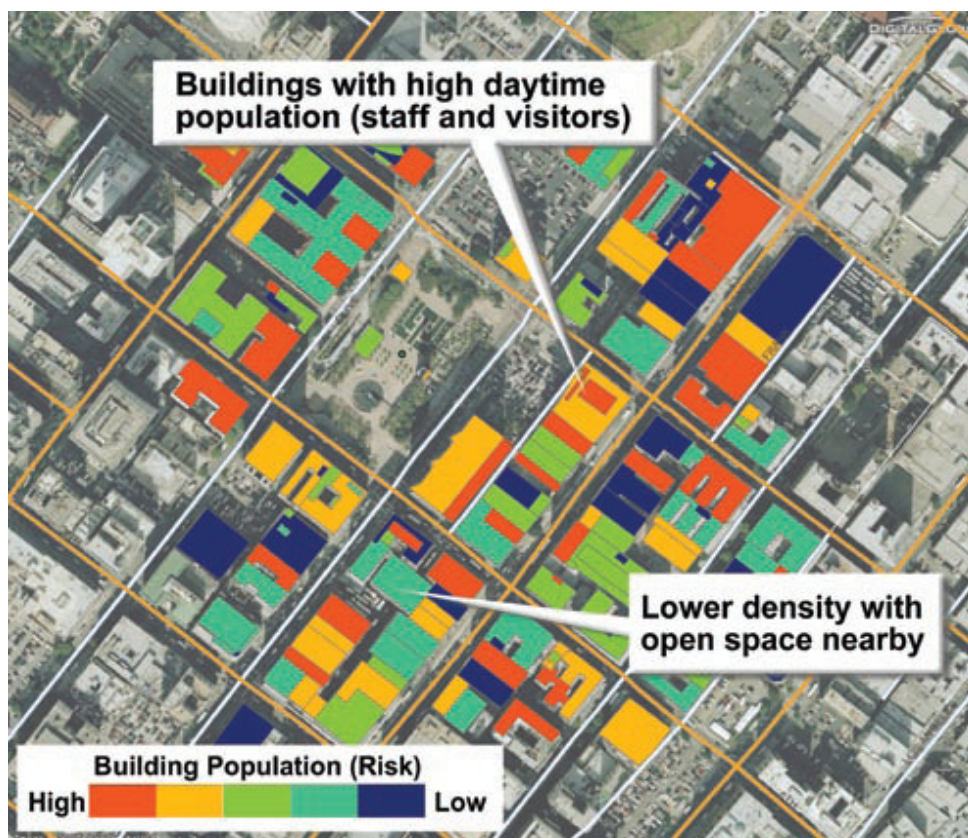
1. GIS allows the company to use the same standard office procedures to process delivery orders each day.
2. Now delivery is more efficient because each night, orders are transmitted to ESRI's ArcLogistics™ Route, which creates routes and prints invoices along with driving instructions including the stops for each truck. In the morning, drivers pick up the printed invoices that ArcLogistics Route has organized by order of delivery.
3. The company found the real power of ArcLogistics Route when deliveries could not be made due to inclement weather or other unforeseen problems
4. GIS allows the company to meet its customers' expectations, even when faced with unforeseen circumstances.

Handling Evacuations “See Your Company” Case Study

Description of the statement :

The location of the office affects the complexity of this task. It can be simple if the business is located in an office park. However, if the office is located in a densely populated city, such as New York City, logistics are more complex. If the emergency is isolated to a single building, it is easier to manage than if multiple adjacent buildings are affected. In the latter case, the plan must take into account the neighborhood surrounding the affected buildings.

After evacuating the office, employees usually meet at a specific location and decide what needs to be done next. Where should employees regroup? Factors such as how far from the building employees can travel with relative ease, taking into account those with disabilities and the presence of open spaces that can be used, must be considered. These sorts of questions are all geographic in nature.



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Figure 5. Identify value of density

The Role of GIS

The Hot Spot Analysis tool is used to find the location of statistically significant spatial clusters of high- and low-attribute values. This tool shows areas where higher-than-average values tend to be found near each other and where lower-than-average values tend to be found near each other.

The dark blue spots shown in figure 2 represent statistically significant cold spots—areas with few employees that may serve as good meeting places in the event of an emergency. To more clearly see the areas represented by these points, a continuous surface was created using the ArcGIS Spatial Analyst extension (as shown in figure 2). The surface reveals more generalized areas representing cold spots in the data, shown as dark blue spots. These areas are potential sites for meeting points. However, more information, perhaps obtained from orthophotos of the area, would be required before selecting a final location.

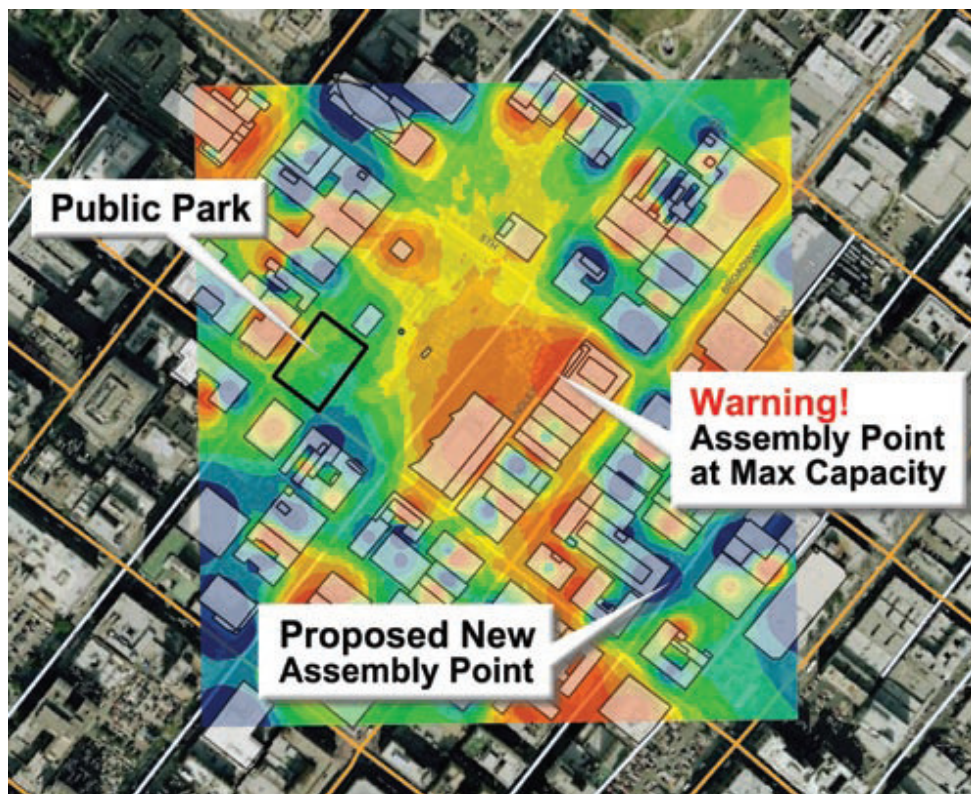


Figure 6. locations of statistically significant spatial clusters of high- and low-attribute values

5. Conclusion

Commercial organizations using GIS can provide high-quality, accurate BCPs that integrate many types of data from multiple sources, incorporate geography, and use new tools developed specifically for spatial statistical analysis. ESRI GIS, through the use of spatial techniques, enables BCP analysts to ask different types of questions and obtain better answers than they could previously using tools that relied solely on databases, spreadsheets, and traditional business intelligence packages.

References:

- 1- P. Croswell , GIS Requirements and Planning Services,
- 2- G. Rybarczyk, C. Wu, Bicycle facility planning using GIS and multi-criteria decision analysis, 2010.
- 3- Jason J. Taylor, Daniel G. Brown, Larissa Larsen , Preserving natural features: A GIS-based evaluation of a local open-space ordinance, 2007.
- 4- http://www.townofcary.org/Departments/Technology_Services/GIS/What_Departments_Are_Using_GIS_.htm
- 5- <http://www.allbusiness.com/accounting-reporting/record-keeping/780898-1.html>.
- 6- <http://www.esri.com/showcase/roi/benefits.html>
- 7- <http://www.uwex.edu/ces/cced/economies/tmagis.cfm>
- 8- <http://geography.about.com/od/geographictechnology/a/businessgeog.htm>

