

Wireless Technology: Making Neighborhood-Based Data Collection Manageable

by Eric Hoffman

Information gathering, conducting surveys, data analysis—these phrases can strike fear in the hearts of community development corporation (CDC) staff and volunteers. While effective project and neighborhood planning requires good data, collecting and analyzing neighborhood data is a time-consuming and labor intensive job. Fortunately for Philadelphia's CDCs, this monumental task has been made easier by the development of the Pocket Neighborhood Inventory System (Pocket NIS). This software application developed by the Philadelphia Association of Community Development Corporations (PACDC), used in conjunction with a handheld computer, helps process data, increases the quality of data gathered, makes data collection and analysis simpler, and establishes a basis for measuring changes in a neighborhood over time.

Philadelphia CDCs have used this innovative technology to make more informed decisions about specific housing development, housing preservation, economic development and open space activities they will pursue. Even more importantly, this technology has played an instrumental role in strengthening CDC neighborhood strategic planning efforts. An enhanced neighborhood data collection process allows CDCs to think more strategically, improve planning, and enlist other agencies as partners in progress in rebuilding and revitalizing neighborhoods.

Walking the Streets

Philadelphia CDCs have chalked up a long track record of collecting data to improve their community revitalization efforts. Typically, CDCs began completing neighborhood surveys primarily to satisfy contractual obligations. Realizing the value of utilizing such data in developing neighborhood strategic plans, however, they soon expanded their efforts to guide program and budget decisions. However, due to a lack of affordable and accessible technology, community organizations would send resident volunteers and summer interns out into the neighborhood to traipse up and down each block and note each property's address, land use, and occupancy status *by hand*. The surveyed data of structures and open spaces was typically recorded with pencil and paper and catalogued in a series of three-ring binders with an occasional photograph of the property taped to the page. This "system" of notebooks of data did not lend itself easily to statistical and geographic analysis or provide a clear understanding of neighborhood dynamics. Moreover, this approach requires intensive coordination, and is prone to input errors and misjudgment. This is especially true if the data is input by multiple users and even more so if they are using different classification methods. Processing and cleaning databases becomes even more complicated as each user devises their own survey instrument and classification systems.



With initial seed support from the City's Office of Housing and Community Development, in 2001 PACDC launched its ambitious Pocket NIS program to enhance the strategic planning and community outreach efforts of Philadelphia's CDCs. By assembling a small fleet of Compaq iPAQ Pocket PC's, distributing them to CDCs engaged in collecting information about their communities, and training staff and volunteers, PACDC has prepared these organizations to create and maintain neighborhood inventories of their service areas. The software developed by PACDC has enabled CDCs to use wireless handheld technology to streamline and strengthen the neighborhood data collection process, and has succeeded in generating interest among other CDCs and neighborhood-based organizations in better documenting neighborhood conditions and their development activities.

Streamlined Strategic Planning in Philadelphia

The Pocket NIS is a flexible yet detailed instrument capable of compiling neighborhood information across a range of topics. To date, the Pocket NIS has been customized to collect data to evaluate the structural condition of property, identify opportunities for housing development and preservation, compile business data for commercial properties in neighborhood commercial corridors, and catalogue vacant lots as well as Brownfield parcels to address illegal dumping and its associated environmental problems. In some cases, additional modifications have been undertaken to meet the survey needs of CDCs. Following are

some real-life examples of how Philadelphia’s CDCs have used this innovative technology to strengthen their community revitalization efforts.

Helping Homeowners

Philadelphia has a Targeted Basic System Repair Program (Targeted BSRP) that aims to stabilize and improve selected neighborhoods at risk of blight. The Program funds CDCs with grants of up to \$200,000 to administer the program, which offers services such as plumbing, heating, electric, and structural repairs as well as façade improvements. PACDC helped CDCs applying to the program collect and map information on vacant property and homeownership rates to demonstrate that they met the program guidelines. Once selected to participate in the program, they used the Pocket NIS to survey the condition of individual homeownership units in their neighborhoods to identify properties best suited for home repair work through the program.

Strengthening Commercial Corridors

A recent illustration of proactive planning using the Pocket NIS involves the Philadelphia Commercial Corridor Redevelopment (PCCR) Initiative, a program launched by Philadelphia Local Initiatives Support Corporation to assist eight CDCs in increasing neighborhood economic and employment opportunities and creating vibrant neighborhood commercial corridors. The CDCs participating in the program wanted to restore value to these commercial districts. By emphasizing design, organization, promotion and marketing, economic restructuring, and real estate development, the agencies hoped to improve the quality of stores, store operations, and public spaces.

First, the CDCs compiled a comprehensive inventory of properties on their corridor to identify ownership, condition of storefronts, and the types of businesses that would promote commercial revitalization and retention. The Pocket NIS helped CDCs establish a benchmark against which established changes in the neighborhood can be measured.

Two CDCs participating in the PCCR initiative took the survey data collected with the Pocket NIS a step further. The PCCR data was supplemented with other demographic and economic data sets and presented at several community-wide meetings in order to outline recommendations for the development of neighborhood strategic plans. The results of the public participation exercise revealed resident’s perceptions regarding needed improvements to their neighborhood.



Identifying Changes Needed in a Neighborhood

The Pocket NIS can also enhance neighborhood planning processes, which help CDCs gain a better understanding of neighborhood dynamics, better prioritize and target resources, and make better-informed decisions about neighborhood issues. Project H.O.M.E—a comprehensive social service agency in North Philadelphia that provides residential and support services to homeless men and single mothers, has built a state-of-the-art community technology facility, and runs an open space management program—undertook a blight reduction project. The stated goal of this neighborhood plan was to “stabilize up to one acre of land, within designated communities, by clearing and re-vegetating underutilized publicly owned open space”.

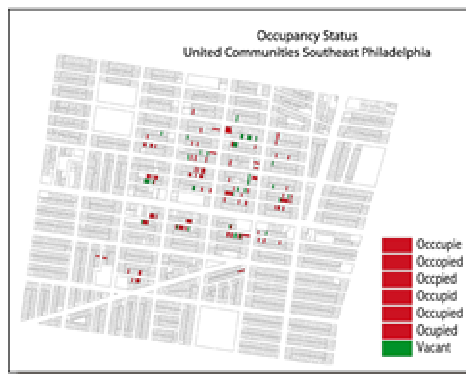
Using the Pocket NIS, Project H.O.M.E. collected data to develop a neighborhood inventory. The project steering committee and community representatives selected several clusters of vacant lots for cleaning and greening, covering nearly eight square blocks of the 33 square block target area. The sites were chosen with an eye toward high visibility and low maintenance, to support a key project goal of “creating enduring patterns of land use and development that will stimulate investment and encourage long-time residents to remain in their neighborhoods”. The sites were cleared of refuse and attractively landscaped.

While the project focused primarily on open space issues, an unanticipated discovery about the community's housing stock has had a more lasting impact on Project H.O.M.E.'s strategic planning process. In drafts of maps of the inventory data collected using the Pocket NIS, the steering committee and community residents identified high concentrations of abandoned and neglected property in rows of aged two-story houses. Such older houses, often with small living space and no yards, are not attractive homes to prospective homebuyers with growing families, especially when more gracious larger homes are readily available for low upfront cost.

Based on this information, the resulting strategic plan, *From Spaces to Places: A Neighborhood Action Plan*, recommended restructuring these blocks by demolishing unsalvageable structures to decrease housing and population densities and create open space for yards, gardens, and off street parking. Additionally, the plan proposes combining adjacent two-story structures to increase livable space per residential unit to be more attractive to potential homeowners.

How Pocket NIS Does It Better

The primary impetus for the development of the Pocket NIS was twofold: 1) to increase the quality of the neighborhood-based data collected by Philadelphia CDCs, and 2) to provide a more accessible and encompassing tool to more effectively inform programmatic decisions and strategic planning efforts. The technology of the Pocket NIS improves on existing survey methods and streamlines the data collection and GIS mapping processes.



Paper-based surveys are prone to input errors of several types. The most common errors are typographical entries and variations on the spelling and format within property address fields. These errors add to the processing time needed to clean and prepare the data for analysis and GIS mapping. The Pocket NIS application reduces such errors by restricting users to select responses from listboxes (predefined lists) and checkboxes (true/false responses). The Pocket NIS ensures that responses are typographically correct and consistent because the application enters the data into the database, not the user.

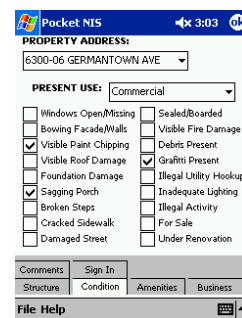
An additional advantage to using the Pocket NIS technology is that it reduces the time to physically conduct a neighborhood inventory by half when compared to the pen and paper survey method. With the old-fashioned approach, each property in the database is recorded twice—once as the surveyor makes notation of the property in the field and once when it is subsequently entered into a spreadsheet or database application. The more steps and time involved in compiling a database increases the potential for introducing errors and ultimately the processing time needed to prepare a database for analysis and mapping. The survey application using a Pocket PC requires only one step in recording the information about a property directly at the source of the information.

With paper-based surveys, different surveyors sometimes devise their own shorthand for noting property addresses. Many variations on the spelling of a street name and the format of the entire address field significantly increases the time needed to prepare the database for geographic analysis. To reduce the need to extensively clean the address fields of a database, geographic identifiers—unique numbers based on the property's five-digit street code and five-digit house number—are assigned to every parcel in the city. Based on existing GIS systems, these identifiers or "tencodes", are pre-loaded into the Pocket NIS application. Not only are all known city properties available to surveyors, this feature also makes the transition from the database to maps, tables, and charts a much cleaner process. Properties that have unknown addresses to surveyors can be added to the application minus a geographic identifier for the added property.

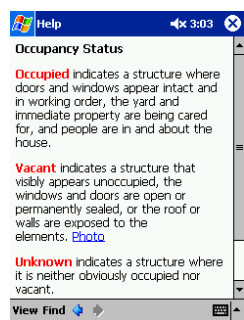
**543 WEST CECIL B MOORE AVENUE
543 WEST CECIL B MOORE AVE
543 W CECIL B MOORE AVE
543 W. CECIL B MOORE AVE.
543 CECIL B MOORE
543 W MONTGOMERY AVE**

The Pocket NIS technology also minimizes the subjectivity that inherently exists between surveyors and observations, especially as it pertains to evaluating the structural condition of a building. Determining whether a structure is in good, fair, or poor condition requires judgment and bias from the surveyor. For example, student interns that have not spent much time in neglected urban neighborhoods generally record more negative observations about the condition of structures than people that have spent their entire lives residing in that same inner city neighborhood. Inexperienced surveyors also tend to rate the structures overall appearance rather than the structural soundness of the building.

To reduce user subjectivity and alleviate confusion in evaluating the structural condition of a building, the Pocket NIS incorporates a list of specific structural details to be examined. Rather than prompting the user to rate the overall condition of a property as good, fair, or poor where judgment would be required, the user must note whether a specific structural detail does or does not exist. When analyzing the data, an indicator or score can be constructed from the list of structural details to indicate the level and severity of the structural integrity or blight of the buildings in the neighborhood.



The Pocket NIS also offers an extensive HTML-based help file that provides a definition for each survey element and a description of each possible response.



Additionally, a link to a real world photo of each survey element is supplied as a visual example.

Finally, the Pocket NIS application requires the user to complete a core set of data for each property surveyed. Once completed, a copy of the database is sent to the University of Pennsylvania's Cartographic Modeling Laboratory (CML) which maintains a web-based Neighborhood Information System (NIS) – www.cml.upenn.edu/nis. The neighborhood data is integrated with other data sets from City of Philadelphia agencies, the U.S. Bureau of the Census, and digital photos. Authorized users of the NIS can easily generate maps and reports of selected properties and create summary tables of their neighborhood.

Conclusion

Standardizing the neighborhood data collected by CDCs has made the data available for citywide comparability. As each CDC contributes its neighborhood data to the pool of information collected with the Pocket NIS, CDC efforts to document neighborhood conditions increases in value and gain a wider audience, opening avenues to share information and facilitate community research.

Since 2001, 23 organizations have used the Pocket NIS to more effectively conduct inventories of their neighborhoods. Wireless handheld technology has streamlined and strengthened the neighborhood data collection process and has succeeded in generating interest among other CDCs and neighborhood-based organizations to identify development opportunities. This low-cost, high-tech tool has enabled CDCs to produce higher quality, more reliable data more simply, quickly, and thus less expensively. Consequently, CDCs can make well-informed decisions to strengthen Philadelphia's low-income neighborhoods and residents.

Eric Hoffman is Director of Information and Technology for the Philadelphia Association of Community Development Corporations. For more information, he can be reached at ehoffman@pacdc.org or (215) 732-5829.