NSDI Cooperative Agreement Program
Participation in *The National Map*
Final Report – February 2007

Cooperative Agreement Number: 04HQAG0191
Project Title: New Jersey Partnership for *The National Map*
Project Start/End Date: September 2004/February 2007
Project Lead Organization: New Jersey Office of Information Technology, Office of Geographic Information Systems
Project Lead: Andrew Rowan
USGS Mapping State Liaison: Roger Barlow
Collaborating Organization: City of Camden
Data Themes:

Aerial Photography	Parcels
Census	Police
Community Facilities	Railroads
Environmental	Roads
Fire	Schools
Government Boundaries	Zoning/Districts
Infrastructure	

Summary

On September 10, 2004, the State of New Jersey Office of Information Technology Office of Geographic Information Systems (NJ OGIS) was awarded $71,790.00 by the U.S. Geological Survey to implement the 'New Jersey Partnership for *The National Map*.' This funding allowed the State to purchase hardware and software for a local government node on the New Jersey Geographic Information Network (http://njgin.nj.gov).

Hardware was installed at the City of Camden in March 2005. Software installation, and data and metadata loading occurred in March 2006. Map services and metadata were loaded in April 2006. The delay in software installation, and data, map services and metadata loading occurred because of lack of staff with GIS and systems administration experience at the City of Camden MIS Department. That problem was rectified in June 2006 with the hiring of a capable GIS Coordinator.

NJ OGIS coordinated and fully participated in the installation of the software, and data, map services and metadata loading. Project administration and management services were provided by the State as part of the cost-share for this award. Coordination of these activities will continue between NJ OGIS and City of Camden MIS Department into the foreseeable future.

A breakout of all hardware and software costs is provided below:

Hardware (Dell)	Unit Cost	# of Units	Total Cost
PowerEdge 2850	$ 6,330.25	1	$ 7,655.00
PowerEdge 4600	$14,540.75	1	$14,376.40
PowerVault 122T	$10,226.75	1	$10,666.80
Storage Rack	$ 3,360.00	1	$ 3,939.25
		Hardware Total:	**$36,637.45**
Software (Microsoft/ESRI)			
Win2003 OS	$ 717.40	3	$ 2,152.20
SQL Server	$ 4,772.98	2	$ 9,545.96
ArcIMS	$ 8,200.00	1	$ 8,200.00
ArcSDE	$ 9,500.00	1	$ 9,500.00
		Software Total:	**$29,398.16**
Data Assessment			
OGIS Staff	$ 5,7725.12		**$ 5,772.12**
		Software Total:	**$71,807.73**

Total cost of hardware, software and data assessment that supports the City of Camden NJGIN node was $71,807.73.

Participants

New Jersey Office of Information Technology Office of Geographic Information Systems (NJ OGIS)

City of Camden Office of the Chief Operating Officer (COO)

City of Camden Department of Management Information Systems (MIS)

City of Camden Department of Public Works (DPW)

City of Camden Department of Code Enforcement (DCE)

City of Camden Department of Health and Human Services (HHS)

City of Camden Police Department (Police)

City of Camden Fire Department (Fire)

Camden Redevelopment Agency (CRA)

City of Camden Geospatial Datasets

Datasets are available for City of Camden staff on the City's network. Each dataset has FGDC compliant metadata that are published on the New Jersey Geographic Information Network (NJGIN). Metadata are harvested by Geospatial One-Stop from NJGIN on a bi-weekly basis.

The datasets below were chosen through an exhaustive data assessment process involving most of the departments within the City of Camden government structure. Out of 103 municipal datasets documented during this process, 24 were ultimately chosen for their relevance and geospatially enabled format. Camden County Improvement Authority (CCIA) provided six additional datasets and NJ OGIS provided one additional dataset. Further dataset development and conversions were performed by NJ OGIS to consolidate or add spatial and attribute information, and provide a common spatial reference.

Aerial Photography
1992 Aerial Photography
2002 Aerial Photography

Census
Census Tracts

Community Facilities
Churches
Community Centers
Day Care Centers
Hospitals
Rooming Houses

Environmental
Brownfield Sites
Water Edgelines

Fire
Fire Stations

Government Boundaries
Municipal Boundary

Infrastructure
Bridges
Sewer Lines
Water Lines

Parcels
Blocks
Parcels

Police
Police Grids
Police Sectors and Districts
Police Stations

Railroads
Railroad Lines

Roads
Rights-of-Way
Roads

Schools
Schools
School Safe Corridors

Zoning/Districts
Election Districts & Wards
Empowerment Zone
Historic Districts
Planning Districts
Urban Enterprise Zone
Zoning

City of Camden Publicly Accessible Map Services, The National Map and GOS

ArcIMS feature and image services were developed by NJ OGIS to "serve out", or provide public access to, the datasets over the Internet. The services are available to the public at http://njgin.ci.camden.nj.us by using an ArcGIS client such as ArcView, ArcEditor or ArcInfo9.x, or ArcExplorer9.2. Each ArcIMS service has FGDC compliant metadata that are published on NJGIN.

Open Geospatial Consortium (OGC) connectors, which convert ArcIMS services to OpenGIS formats, provide access to OGC compliant Web Map Services (WMS) for The National Map. Geospatial One-Stop (GOS) harvests metadata from NJGIN, including those records maintained on the City of Camden node, on a bi-weekly basis.

Map services were developed based on the data themes listed below. Each theme has a feature and image service except CamdenCity_AerialPhotos2002, which has an image service only. Data themes were developed by consensus between NJ OGIS and City of Camden staff.

CamdenCity_AerialPhotos2002 – high resolution aerial photos from 2002
CamdenCity_Community – community resources
CamdenCity_Emergency – emergency management
CamdenCity_Environment – environmental resources
CamdenCity_MunicipalBoundary – municipal boundary
CamdenCity_Municipality – municipal planning resources
CamdenCity_Parcels – municipal blocks and parcels
CamdenCity_Roads – road network
CamdenCity_Transportation – transportation infrastructure

Data Viewer

Site Investigator, a data viewer developed by NJ OGIS and Environmental Systems Research Institute (ESRI), was customized and installed by NJ OGIS to view City of Camden municipal parcels and zoning data, and several other datasets via web services developed by NJ OGIS from a State geospatial data server. The viewer at http://njgin.ci.camden.nj.us/SI has significant application for use by City staff and for public consumption regarding environmental, planning, and land use information. The City has the option to insert or remove data and information into or from the viewer as desired. The following is the list of datasets enabled for the City of Camden data viewer:

Aerial photos	State plan designated centers
Land use/landcover	Surface water quality standards
Roads	Water bodies
State open space	Watershed boundaries
State planning areas	Wetlands

Training

NJ OGIS staff provided training on October 3, 2006 to the City of Camden GIS Specialist (and Coordinator) for administration of the NJGIN spatial data node. Training included configuration, maintenance and documentation for the system's core components - ArcSDE, ArcIMS and SQL Server. Training was intended to provide information needed for troubleshooting, and long-term maintenance and administration of the node. NJ OGIS staff developed a training manual for NJMapp and an associated program, the Emergency Preparedness Initiative Network (EPINet), to structure training and provide a resource for NJMapp partners to maintain and administer their nodes. The City of Camden was the first NJMapp partner to receive the manual.

Configuration of the system was documented during the training session and the earlier software installation, and during the data and map services load in March 2006. The documentation was supplied to the City of Camden GIS Specialist and is kept by NJ OGIS to provide the information for on-going support when necessary.

NJ OGIS provided comprehensive metadata training to City of Camden staff in June and September 2005. Training will enable City of Camden staff to maintain existing metadata records and develop future metadata records for each department's datasets and map services. Seventeen City of Camden staff attended metadata training from the following departments:

CRA	2	HHS	2
DCE	2	MIS	2
DPW	4	Police	2
Fire	2	Tax Office	1

Challenges

Many obstacles needed to be overcome to implement the City of Camden NJGIN node. These obstacles accounted for difficulties in coordination, administration and implementation, and necessitated an extended project timeframe.

The main challenge was with institutional capacity and continuity at the City of Camden. Whereas the City has experienced, competent staff in their MIS Department, there were no staff with GIS experience or the capacity to take on a dedicated role as GIS Coordinator. CRA has a staff person with a high level of GIS expertise and DPW has a staff person with a moderate level of expertise, however their roles for their respective departments precluded them from becoming a citywide GIS Coordinator.

Budget constraints and a hiring freeze delayed the employment of a GIS Coordinator for the first two years of the project. Although NJ OGIS was able to initiate the project and accomplish many of the tasks without the involvement of a GIS Coordinator, the project progressed slowly and the final few tasks could not be performed.

This problem further manifested itself in the data assessment, data collection and metadata cataloging processes. For the data assessment process staff for the various departments at the City of Camden were not able to filter out much of the extraneous information that was delivered to NJ OGIS, which then became a burden to assess.

Collection of GIS data became a problem because of a lack of a structured, coordinated or centralized repository. Datasets on many different computers in various incarnations required time consuming searches and analyses to determine fitness for use - which were the latest and/or most comprehensive.

Metadata were very difficult to collect because of a lack of institutional continuity and documentation. Many datasets were developed by staff who no longer worked for the City or by those that could no longer remember how data were developed. Weeks of interviews were able to aid in the metadata development process, but much memory of data development was lost.

Technological obstacles were expected, as with any highly sophisticated system with so many "moving parts." Implementation of the node required a vast array of expertise for setting up the hardware and software to work as seamlessly as possible. This was accomplished by troubleshooting and working through many difficulties.

One such difficulty was encountered on the day of the software (ArcSDE, ArcIMS, SQL Server and Servlet Exec) install and data (GIS data, map services and metadata) load. The tech who had earlier set up the hardware did not install Windows 2003 OS correctly. Upon the software install it became apparent that the array of software wasn't working together correctly. NJ OGIS staff were able to sleuth the problem after several attempted fixes. Unfortunately, this required an uninstall and reinstall of the OS and software. Fortunately, NJ OGIS staff had the knowledge and experience to perform this. Once the reinstall was complete the data were loaded without further incident.

In conclusion, NJ OGIS regards the project as highly successful. This success was predicated on the fact that USGS was extremely patient with the slow, but necessary pace of progress for the project. Staff at The National Map were extremely helpful and excellent to work with.

The City of Camden now has an established coordinated citywide geospatial program with the requisite hardware, software, data, map services, metadata, data viewer and expertise to carry it forward into the future. The State of New Jersey has an important new partner in its geospatial network. The USGS has received the deliverables required for the Cooperative Agreement Program grant. Map services for framework and other data for the City of Camden are now consumed by The National Map. Metadata for datasets and map services are now harvested by Geospatial One-Stop.