Overview of the Burrillville, RI GIS Development Project

The development of a Geographic Information System for the Town of Burrillville began seven years ago. In 1990, the Town was facing the prospect of doing a real estate revaluation with an antiquated, inaccurate, and partially illegible assessor's mapping system. The Town decided to have new maps prepared prior to the State mandated revaluation. We determined that the new maps would be prepared from aerial photography, with new control points added to existing known points to improve town wide accuracy and that the new maps would be done at a scale of 1 inch to 100 feet. We knew also that we were interested in pursuing GIS technology. Therefore one of the "deliverables" was these mapping data in digital form.

The Town was flown in the spring of 1991 and planimetric maps were prepared showing most all of the physical features discernable on the aerial photography. This included the traveled way of all roads, all houses, fences, stone walls, landscape plantings around homes, lakes, streams, most wetlands, and a variety of other items like telephone poles and manhole covers. At the same time, all of the Town property records were examined, including plans of record and deeds of lots not shown on recorded plans. A preliminary "lotting' plan was prepared and "rubber sheeted" over the planimetric plan to fit the apparent lines of occupation of existing residences and businesses. This provided us with an accurate parcels map of the entire Town.

The Town subsequently performed its mandatory revaluation. This task included the physical examination and measurement of every building in Town and included a detailed listing of the physical attributes of all the buildings. These attributes include the age of the building, its dimensions, gross square footage, net square footage, number and type of rooms, siding and roofing materials, dates of recent building permits, land and building values and other incidental details. These data were also required to be delivered in digital form in addition to the hard copies needed by the assessors office.

It was now 1995 and we were ready to move forward with our GIS project. An informal users group was set up consisting of the Town Assessor, DPW Superintendent, Information Systems Manager and Town Planner. We did an informal assessment of our needs and computer capabilities. We determined that we did not have the staffing to utilize the full ARC/INFO package. The ArcView package looked good and, in fact, was being updated about the time we were ready to take the next step. Therefore we advertised a request for proposals for services to take our new mapping and assessment data and create a GIS utilizing ArcVeiw 2 or its equivalent.

The low bidder using ArcView 2, was Databasics, Inc of North Kingstown. As we were negotiating the final contract, they asked if we would be interested in a new, easy to use, powerful and cheap GIS package called Maptitude, written by the Caliper Corporation from Newton, Mass. As it offered to do everything ArcView 2 would do, and more, and was one-third the price we decided to use it for our GIS. Another early decision was to create four separate stand alone GIS installations. This was largely because one installation, the DPW, would be located over a mile from the Town Hall and we foresaw problems attempting to transfer data at a

reasonable speed to a remote station utilizing a network. The Town acquired four 100 megahertz pentium computers, four HP 850C Deskjet printers and a HP 250C large format ink jet plotter for use with the GIS.

Parcels

Databasics subcontracted Envirographics of Chester, Conn. to convert the AutoCad parcels map files into Maptitude files using ArcCAD. They also had to edge match each of the 273 separate assessors maps to create a single parcels map which was the first layer and the basis of our GIS. Each parcel was verified to be a closed polygon with a unique identifier.

Roads

Once the parcel layer was available, Databasics converted the U.S. Census Bureau's 1994 TIGER street network file for Burrillville to Maptitude and displayed it over the parcels layer. This task included writing a special data entry program using the Maptitude programming language to provide easy update capability of TIGER attributes for new or revised street segments. Databasics adjusted the geography of all roads to fit midway between the front parcels boundaries. At the same time we corrected names and address ranges using several town sources, including town 911 numbering maps.

Census Boundaries

Throughout all road additions, deletions, and revisions, we maintained the TIGER census tract and block definitions. We then extracted the road segments having different census tract and block identifiers on both sides and used them to construct census block and block group boundaries. Thus, the boundaries line up perfectly with the roads when used to display census and demographic data.

Utilities

We provided Databasics with maps of water lines, water towers, wells, sewer lines, sewer pump stations and fire districts from the various entities "owning" these facilities. Using a special Maptitude program they entered the data on-screen, "snapping" the lines to road lines as needed to provide perfect alignment.

Signs, Culverts and Bridges

Databasics collected information in the field on signs, culverts and bridges. They prepared a 3 ft by 5 ft reference map of all roads, colored by type and showing water and other features. They wrote a special Maptitude program to enter sign culvert and bridge data and set it up on the town's notebook computer. They obtained a distance measuring wheel with digital readout to tow behind a van used for the field work. When started at an intersection the wheel was reset to 0. As it moved forward it displayed the number of yards driven. The operator zoomed and panned to the road being inventoried in Maptitude and then clicked a special button on screen to draw a

series of tick marks with number labels every 100 yards along the street, starting at the "0" end. When they arrived at a sign they pressed a button, and clicked on the side of the street the sign was on using the ticks as a guide. The program displayed a data entry screen with pull down lists of sign types and other fields describing sign posts and signs. Culverts and bridges were entered in a similar way. As a road was finished it was highlighted on the manual reference map in order to track completed roads.

RIGIS Layers

Databasics obtained 38 uncompressed Arc/Info export files from RIGIS, clipped them at the town border in PC ARC/INFO (as necessary) and imported them into Maptitude. The RIGIS data had to be converted from NAD 27 UTM meters to NAD 83 State Plane feet. This was done with the assistance of RIGIS personnel.

The End Product

The final GIS database contains 82 layers describing over 181,000 features divided into 167 types. About 16,000 map features were obtained from RIGIS while 165,000 came from photogrametry, field data collection and on-screen digitizing. The entire set of layers occupies about 25 megabytes of disk space.

Copies of Maptitude and all the associated data are located in the Assessors, Building Inspection, DPW and Planning Departments. Our current operating plan calls for the parcels base map to be updated once a year, as the Town Assessors Maps are updated, with the data distributed via either disk of tape backup system. The Public Works Department also has TransCAD for special routing related projects.

Databasics has conducted two training sessions and written several specialized programs to provide quick access to parcel maps and data. However, the ease of learning and use of Maptitude has allowed the early users to make numerous special purpose maps and involve the GIS in decision making.