

### What You Will Need

- ArcPad 6.0.2
- Sample application and data downloaded from ArcUser Online

# Inventorying Infrastructure With ArcPad

Government and commercial organizations that engage in fieldwork can benefit from ArcPad. The many customization options available let users tailor ArcPad functionality to the specific tasks of a given project. This article describes how a sample ArcPad application available from the ESRI ArcScripts Web site ([www.esri.com/arcscrips](http://www.esri.com/arcscrips)) can be used by local government staff who must inventory infrastructure to comply with Governmental Accounting Standards Board Statement 34 (GASB 34).

GASB 34 affects how state and local governments categorize capital fund accounts and capital asset values. GASB is part of the Financial Accounting Foundation, which establishes the Generally Accepted Accounting Principles (GAAP). Although GASB is a private, nonprofit organization that lacks regulatory or enforcement powers, failure to implement reporting required by GASB 34 can have serious consequences for local governments. Current information on GASB 34 can be found at [www.gasb.org/new/index.html](http://www.gasb.org/new/index.html).

Under GASB 34, capital assets related to infrastructure networks, such as roads, bridges, and lighting systems, must be inventoried and valued. ArcPad is being used by many local governments to improve the speed and accuracy and lower the cost associated with this process. ArcPad 6, customized with modifications to the configuration file and the addition of applets, toolbars, tools, forms, and VBScripts created in ArcPad Application Builder 6, can enhance inventory activities undertaken in response to GASB 34.

### About This Exercise

This exercise mimics a typical GASB 34 inventory project and shows how ArcPad improves the inventory process. ArcPad can store the data collected in the field as shapefiles and dBASE files. ArcPad tools for ArcGIS can extract, convert, and project field data. Thus, the data entry and postprocessing tasks required for non-GIS field data collection projects are eliminated.

No additional data is needed to work this exercise. The sample dataset provides empty shapefiles and dBASE files with appropriate attribute fields for storing this fictitious GASB 34 inventory. The NameSign, RegSign, and WarnSign shapefiles contain identical fields so it would be possible to merge all sign

File name	Description	Location
GASB34.apa	Applet that adds custom toolbar and tool buttons	ArcPad\Applets
GASB34.vbs	VBScript that adds points to the map	ArcPad\Applets
GASB.apm	ArcMap map document that contains project	GASB34
GASB34.apa	Applet that adds custom toolbar and tool buttons	ArcPad\Applets
ArcPad.apx	Modified system configuration file that changes interface	ArcPad\System
*.bmp	Bitmap files for icons used by the tool buttons	ArcPad\Applets
AutoGate.shp	Auto gates (i.e., cattle guards)	GASB34
Bridge.shp	Bridges	GASB34
Culvert.shp	Culverts	GASB34
NameSign.shp	Road name signs	GASB34
RegSign.shp	Regulatory signs	GASB34
WarnSign.shp	Warning signs	GASB34
Bground.sid	MrSID image used for background	GASB34

Table 1: Sample data files

data into one Sign shapefile if desired. The files contained in the sample dataset are listed in Table 1.

### Setting Up the Application

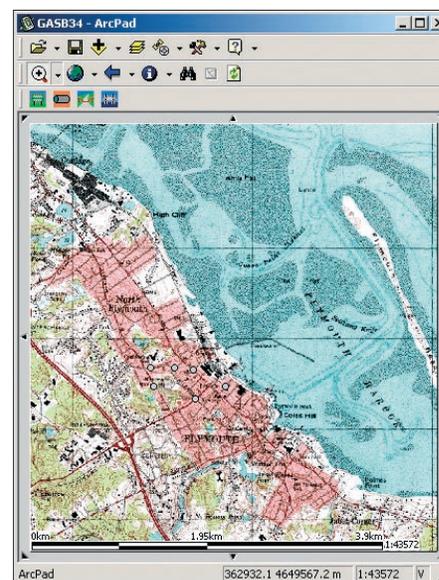
These instructions assume that ArcPad has been installed using the default directories and is functioning properly. Create a folder called GASB34, and unzip the GASB34 archive into it. Move GASB.apa, GASB.vbs, and the bitmap files to the <install directory>\Program Files\ArcPad\Applets directory. Move ArcPad.apx to the <install directory>\Program Files\ArcPad\System directory. Make sure GASB.apm remains in the GASB34 folder along with the unpopulated shapefiles. *Note: If the Applets file path or System file path have been changed using ArcPad Options, place the GASB.vbs, GASB.apa, and ArcPad.apx files in those alternate locations.*

### Running the Application

This application can be run on a handheld or a desktop machine. Double-click on the GASB.apm file in the GASB34 folder. This will start ArcPad and open the map document containing the GASB34 demonstration project. Because the data layers do not contain features yet, the map display will be empty except for

the background image.

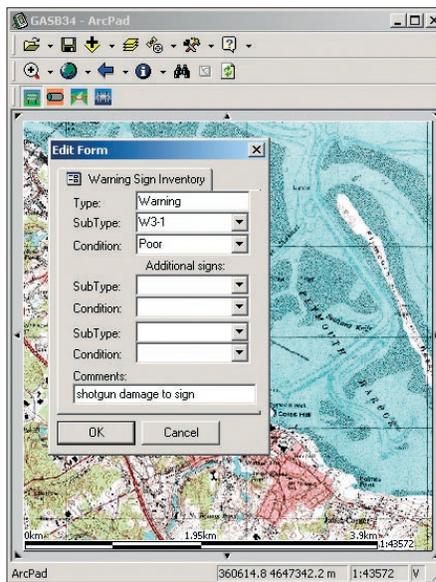
When ArcPad opens, notice that the default interface has been modified. Because



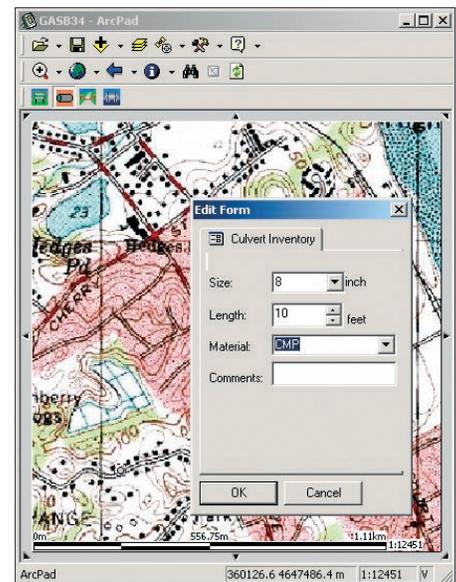
Double-clicking on the GASB.apm starts ArcPad and opens the GASB34 demonstration project. Because the data layers do not contain features yet, only the background image will be displayed.



Clicking on the Sign Inventory tool button and then on the sign's location on the map display generates a point feature and invokes the first Sign Inventory Edit Form.



The edit form for the Warning Sign Inventory contains fields for attribute data such as type, subtype, condition, and comments.



The edit form for Culvert Inventory attributes contains choices in drop-down boxes that are specific to culverts such as size, length, and material.

a typical field data collector might not have many computer skills, the interface has been simplified so that only the tools and menus necessary for completing required tasks are visible. GASB34.apa, the applet that was placed in the ArcPad\Aplet folder, generates a second toolbar in the interface that tailors ArcPad functionality to the requirements of the GASB 34 inventory project. This toolbar, reading from left to right, adds Sign Inventory, Culvert Inventory, Auto Gate Inventory, and Bridge Inventory buttons.

If the application will be used with a GPS unit, a projection file should be assigned to the map. Click on the Layers button to open the Layers dialog box. On the right side of this box, click the Choose a Layer Definition File button. Navigate to the location of an appropriate projection (\*.prj) file or choose one from the <installation drive>\Program Files\ArcPad\Coordinate Systems directory. The modified Main toolbar still contains the core GPS tools, but buttons for adding GPS point, line, and polygon functionality have been removed.

### Collecting Data

The goal of this type of inventory is to quickly acquire data that supplies the general location of, and details about, various types of infrastructure. Although this application can be used by data collectors traveling in GPS-equipped vehicles, it is not crucial to use a GPS unit or a vehicle. Users create point features by clicking on the map display and adding appropriate attribute information using the supplied forms. Step-by-step instructions for using two of the tools, the Sign Inventory tool and the Culvert Inventory tool, are given below. The other tools operate in a similar fashion.

### Using the Sign Inventory Tool

1. Click on the Sign Inventory tool.
2. On the map display, click on the location of the sign. Select Warning from the drop-down box. Click OK.
3. A point feature for the sign is added to the map display, and the Warning Sign Inventory Edit Form is invoked.
4. Begin collecting detailed information using the Edit Form for the Warning Sign Inventory. The SubType field contains the standard code for specific types of warning signs. The Condition field gives the user an opportunity to indicate the sign's appearance. The Additional Signs field allows users to inventory multiple signs that reside on the same sign pole. Include additional details about the sign or area around the sign in the Comments text box.
5. Click OK to accept the edits.

### Using the Culvert Inventory Tool

1. Select the Culvert Inventory tool.
2. On the map display, click on the location of the culvert. The new point feature and the edit form for the Culvert Inventory are displayed.
3. Collect detailed information in the form. The Size field indicates the diameter of the culvert pipe in inches. The Length field indicates total pipe length in feet. The choices for the Material field are Corrugated Metal Pipe (CMP) or Concrete Reinforced Pipe (CRP).
4. Click OK to accept the edits.

Use the same general procedure for inventorying other types of infrastructure. The forms for each are slightly different to accommodate the attribute specific data required. The Readme file included with the sample data gives detailed instructions for using each tool.

### Conclusion

This application illustrates how ArcPad can be customized for a GASB 34 project or other field data collection activity so that data collected in digital form can be quickly added to an existing GIS. The GASB 34 ArcPad Demo was created by Finn Dahl, a member of the technical marketing team at ESRI. Dahl received a bachelor's degree in geography from Appalachian State University in Boone, North Carolina. Upon graduation, he interned with ESRI in the Denver, Colorado, regional office and was subsequently hired as a consultant. Initially he developed MapObjects and MapObjects IMS applications. Now with the technical marketing team, he is a frequent workshop presenter and develops mobile GIS demos for various vertical markets.

Many resources are available for learning about using ArcPad and developing custom applications. Download an evaluation copy of ArcPad from [www.esri.com/arcpad](http://www.esri.com/arcpad). The October–December 2003 issue of *ArcUser* featured a tutorial, "Creating Custom Toolbars for ArcPad," that walks the reader through the process of adding custom toolbars and tool buttons using ArcPad Application Builder. This tutorial and its sample dataset are available from the *ArcUser Online* Web site ([www.esri.com/arcuser](http://www.esri.com/arcuser)). The ESRI Virtual Campus ([campus.esri.com](http://campus.esri.com)) offers two workshops, *Working with ArcPad* and *Customizing ArcPad*. Sample scripts, forms, applications, and wizards for ArcPad are available at no charge from the ESRI ArcScripts Web site ([www.esri.com/arcscrip](http://www.esri.com/arcscrip)). An assortment of time-saving public domain ArcPad templates can also be downloaded from [www.esri.com/publicarcpad](http://www.esri.com/publicarcpad).