

# Digging Into AutoCAD Map 3D 2011 Level 1 Training

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## Digging Into AutoCAD Map 3D 2011

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## About Cadapult Software Solutions, Inc.

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# Sample Exercise

### 8.1 Overview

*AutoCAD Map 3D* can import data from a variety of sources, allowing you to edit and utilize the geometry within a familiar *AutoCAD* environment, while maintaining the **attribute** data that may have been created in a different program. Without the attribute data the file will only come into the drawing as raw geometry, without any attached or linked data. On large areas it would be a monumental task to manually modify every object to contain the desired information.

Utilizing data from other GIS programs inside of *AutoCAD Map 3D* provides tremendous capabilities. However, the ability to use this data effectively requires a few simple steps. When requesting GIS data, be sure to get as much information as you can about the accuracy of the data, how it was created, the coordinate system used, the definitions of the data fields (which are often cryptic), and the accuracy of the geometry. This information is typically called metadata, or the data dictionary.

#### 8.1.1 Concepts

In this chapter you will import street data from an *ESRI ArcInfo* export file, also called an *EOO* file, including the attribute information about the streets. Once the data is imported you will be able to edit and modify the objects and the data associated with them. Another benefit of the import command in *AutoCAD Map 3D* is its ability to convert the data from one coordinate system to another during the import process. You will import an *ArcView shapefile* containing parcel data that was created in a different coordinate system and convert it to the coordinate system of the current drawing.

In addition to importing data to create AutoCAD objects, *AutoCAD Map 3D* also allows you to connect directly to a wide variety of spatial data using FDO (Feature Data Objects) technology. The processes of connecting to GIS data and importing data are very different, and the resulting information that is created in your drawing is also different. Once you have learned how to use both methods, importing and connecting to GIS data, you can then decide which method is best suited for your projects and tasks. In larger projects, you may decide to import some data and connect to other data, and bring it all into another drawing with queries.

### 8.1.2 Terms

**Attribute** - any data attached to an object. In *AutoCAD* you may be familiar with block attributes, which is a way to attach data to an *AutoCAD* block. *AutoCAD Map 3D* expands your ability to attach data to any object, not just a block, with object data and external database links. This means that in *AutoCAD Map 3D* the term *Attribute Data* applies not only to blocks but also to internal object data tables and external databases.

**E00** - an export file of an *ArcInfo* or *ArcGIS* dataset.

**Shapefile** - what is commonly referred to as an *ESRI ArcView Shapefile* is really a group of several related files, consisting of at least an *.SHP* file and a *.DBF* file. The *.SHP* file describes a shape geometrically with a list of its vertices. The *.DBF* file contains feature attributes in a database table. At least these two files must be present for you to import the "shapefile" into *AutoCAD Map 3D*. Other related files may also be present, including a *.PRJ* file containing information which can be used for coordinate conversions.

**Coordinate system** - in *AutoCAD Map 3D*, a "Coordinate System" includes the projection method, the datum AND the base coordinates (Cartesian, Lat-Long, UTM, etc.), - whereas in cartography it only refers to the X,Y coordinates themselves. There are many coordinate systems used throughout the world. For more information, please refer to Appendix A.

**Link Template** - information, including the database name, path, and key column, stored in an *AutoCAD Map 3D* drawing needed to attach records in an external database table to corresponding objects in the drawing.

**Object Data** - attributes attached to drawing objects and stored in object data tables.

**Object Data Table** - table saved within a drawing that stores text and data that is attached to the drawing objects.

**FDO (Feature Data Objects)** - an open-source technology that provides a way to directly access a wide variety of geospatial data sources, such as *ESRI Shapefiles*, raster images, *ArcSDE*, *Oracle* and many others.

## 8.2 Importing Lines

The use of the import command is very similar for all the different types of supported GIS data file formats. However, there are some differences depending on the type of geometry that is contained in those files (points, lines, or polygons). In this section you will import lines representing streets, while converting the associated tabular data to *Object Data*.

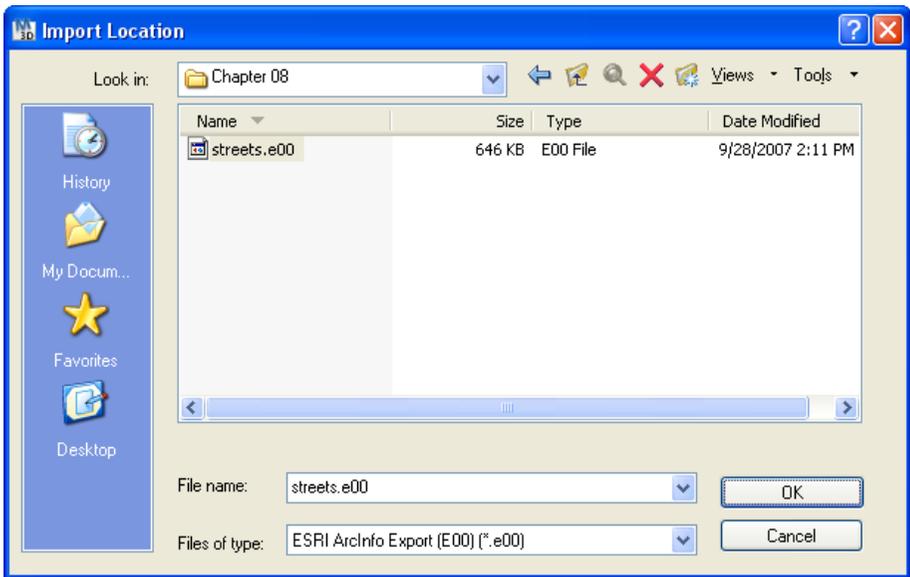
### 8.2.1 Importing an ArcInfo Coverage

In this exercise you will import street centerlines that were sent to you as an E00 file. An *ArcInfo* coverage may either be stored as a directory of related files, or exported into a single E00 export file from ArcInfo or ArcGIS, as in this exercise.

1. Press **Ctrl + N** and select the default template **map2D.dwt** to start a new, blank drawing.
2. Select **Ribbon: Insert ⇒ Import ⇒ Map Import**.

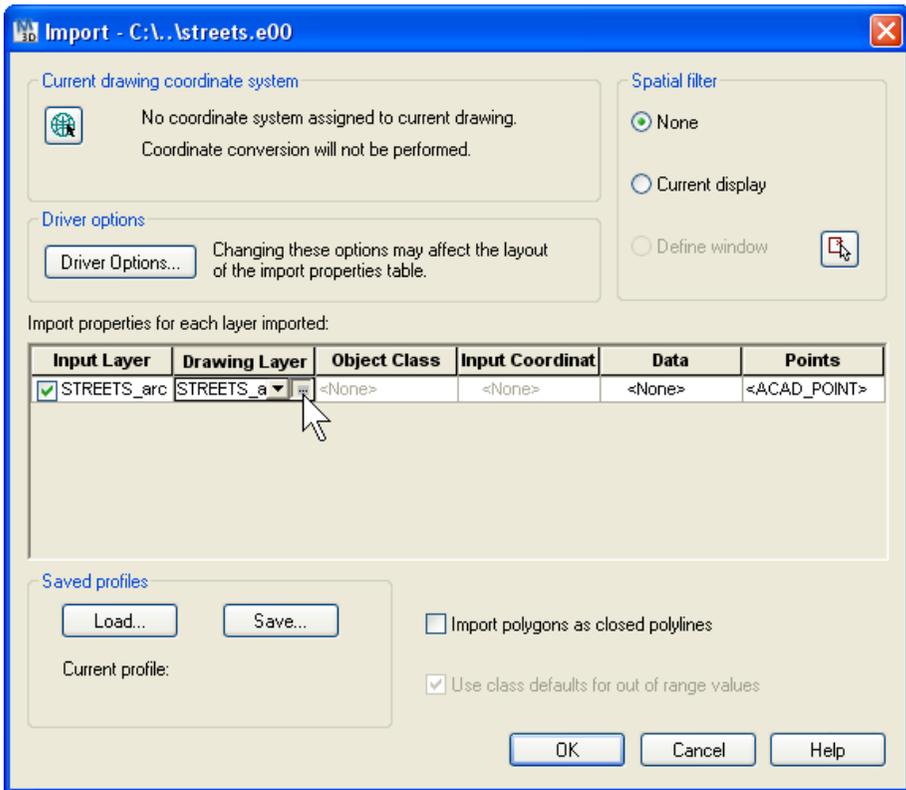


The *Import Location* dialog box opens.



3. Set the file type to **ESRI ArcInfo Export (E00)**.
4. Browse to the *Chapter 08* folder and select **streets.e00**.

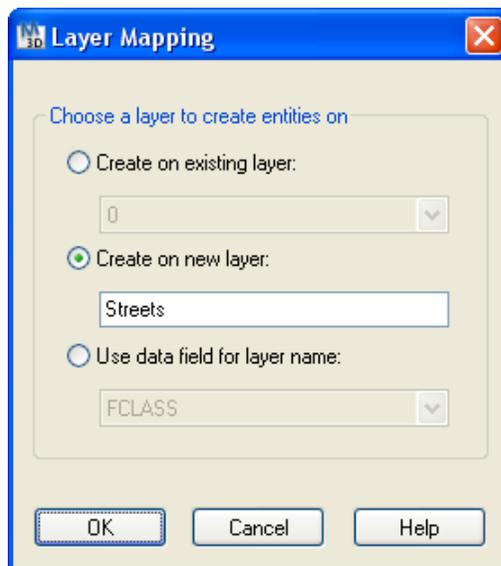
In the *Import* dialog box you can configure the *Layer*, *Coordinate Conversion*, and *Data* options that you wish to use to import the information into *AutoCAD*.



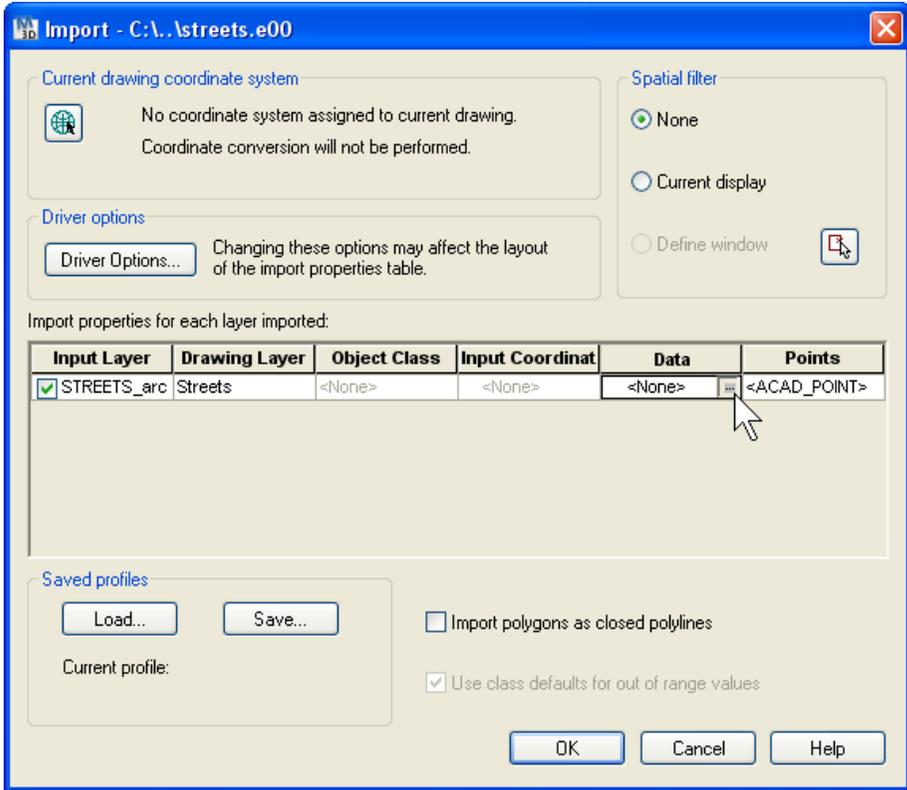
5. Ensure that the **STREETS\_arc** Input Layer is selected.
6. Click on the **Drawing Layer** field in the **STREETS\_arc** row, to activate the ellipses button <<...>>.
7. Click the ellipses button <<...>> to launch the *Layer Mapping* dialog box.

Here you can choose to import the drawing objects onto an existing layer, create a new layer, or select a column of data from the file that you are importing to determine the layer names. This last option will allow you to do some basic thematic mapping during the import of the objects. For example, if you were importing parcel data and that data set had a column for zoning. You could have the import command create a new layer for each zoning type and place each parcel on the appropriate layer for its zoning designation. (See *Additional Exercises* at the end of this chapter for more information).

In this exercise, you will place all of the streets on one new layer.

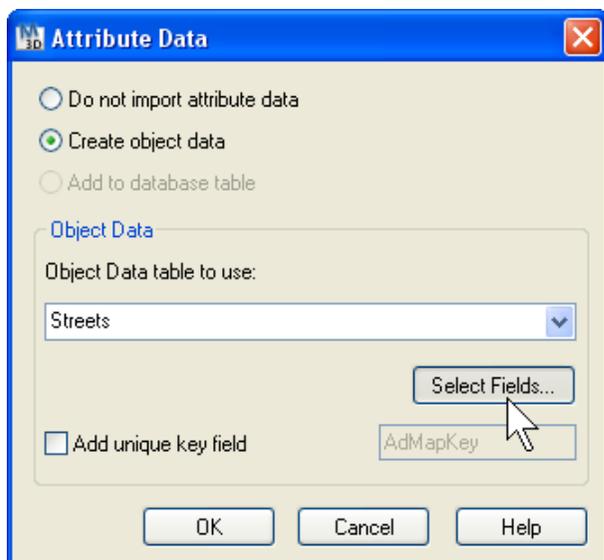


8. Choose the **Create on new layer** option to activate the text box.
9. Enter "**Streets**" for the layer name.
10. Click <<**OK**>> to return to the *Import* dialog box.



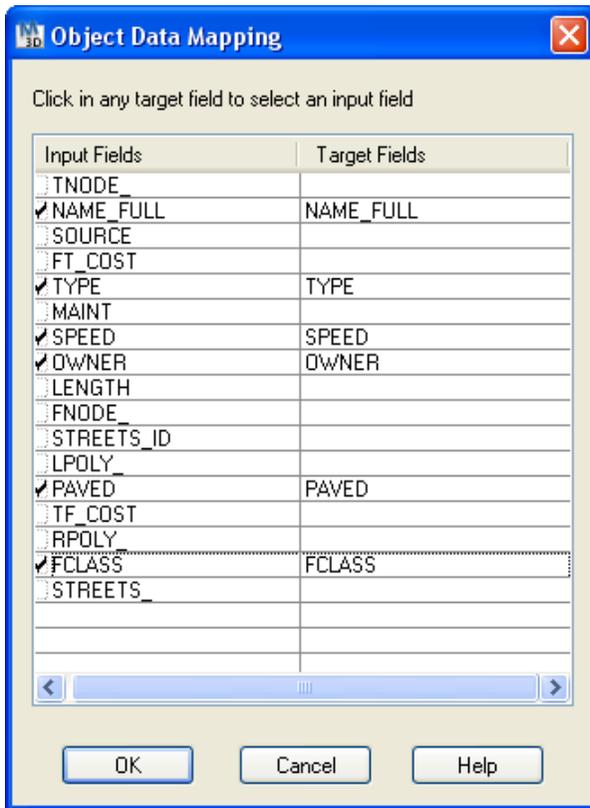
11. Click on the **Data** field in the **STREETS\_arc** row to activate the **ellipses button** <<...>>.
12. Click the **ellipses button** <<...>> to launch the *Attribute Data* dialog box.

Here you specify what attribute data to import and where to store it. You can enter the desired name for the *Object Data Table* and select the desired fields to import. This is the step that allows you to bring the intelligence of the GIS file along with the geometry into *AutoCAD*. By creating the object data table and populating it with the information provided in the coverage you will be able to click on a street and find the street name, type, speed limit, and any other information that was added by the GIS department. This will also allow you to edit the geometry and data from the GIS file in *AutoCAD* and then export it back to any of the supported GIS formats without losing any of the attached data. If you leave the *Data* option set to *None* or *Do not import attribute data*, then you will only import the geometry of the file and you will lose all of the attached information.



13. Choose the **Create object data** option to activate the *Object Data* section.
14. Change the default **Object Data table to use** name to "Streets".
15. Click <<**Select Fields**>>.

Here you specify which fields to import into the *Object Data* table.



16. Deselect all **Input Fields** except **FCLASS**, **NAME\_FULL**, **OWNER**, **PAVED**, **SPEED**, and **TYPE**.

You only need to import the fields that you want to have available. So if there is extra data that you don't need, you can skip it and keep the file size smaller.

It is also important to understand that many GIS programs store geometric data, like length and area, in data tables, while in *AutoCAD* the geometry is a physical property of the object. In this example, if you were to import the length field, it would be a static value in the object data table and would not update if the length of the line is altered.

17. Click <<OK>> to dismiss the *Object Data Mapping* dialog box.
18. Click <<OK>> to dismiss the *Attribute Data* dialog box.
19. Click <<OK>> in the *Import* dialog box to import the file.

The streets are imported into the drawing as polylines, with the GIS data attached as *Object Data*.

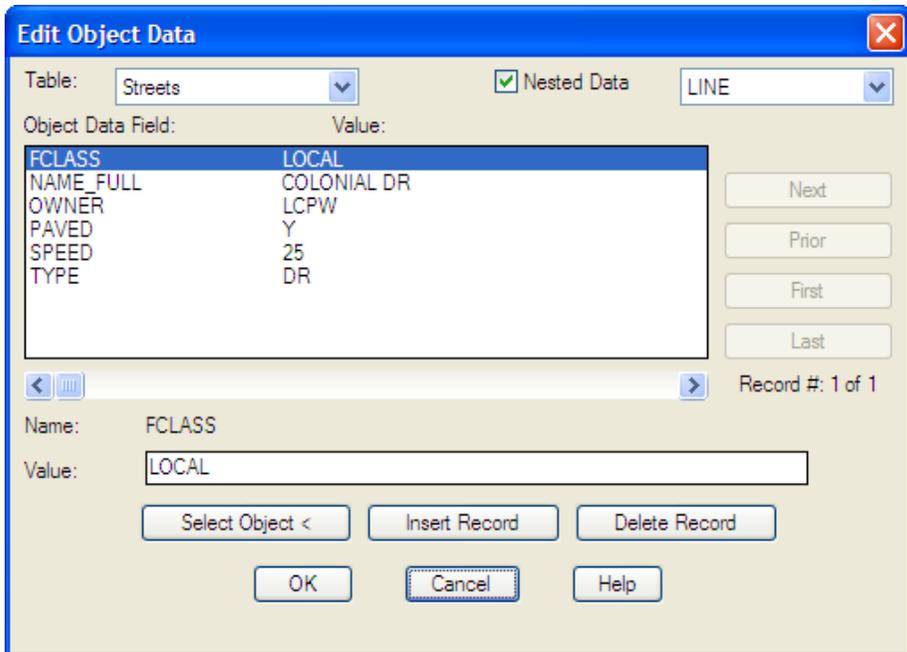
20. Once the 287 objects are imported, zoom to Extents.



21. Select Ribbon: Object Map ⇒ Object Data ⇒ Edit Object Data.



22. Pick a line segment anywhere in the drawing.



Here, you can view the object data associated with the line segment you picked. You can also change the value of any field in this object's data, or even add a record to a new or existing object. It is also possible to view and edit object data using the *AutoCAD Properties* command.

23. View the object data associated with a few other line segments.

24. Click <<Cancel>> once you are through viewing the fields, to avoid saving any inadvertent changes.
25. Save the drawing as “Streets” in the Chapter 08 folder.

### 8.3 Importing Polygons

When polygon data is imported into *AutoCAD Map 3D*, the geometry is created as either a closed polyline or as a polygon object. In previous chapters you worked with polygons that had data attached to the centroids, with boundaries that were cleaned and ready to create a topology. In this case the data is attached to the polygon itself rather than a centroid, so you will need to create centroids, and then attach the data to them.

Data can be attached either to a closed polygon, or to a centroid. Attaching the data to a centroid is consistent with the way you attached the database to tax lots in a previous chapter. It is also necessary to structure the data this way to create a topology. A topology is simply the relationship between lines, nodes, and polygons, defining the way they connect to each other, making complex GIS analysis between these objects possible. Although this advanced concept is beyond the scope of this introductory book, it is important to understand that building topologies is necessary for performing most GIS analysis, and that centroids serve as handles to which data can be attached to polygons in a topology.

#### 8.3.1 Importing an ArcView Shapefile

*ArcView Shapefiles* are among the most common types of GIS data files that you will likely encounter. In this exercise you will add parcel information from the county, which is in a *Shapefile* format, to the parcels from the city that you have used in previous chapters. This is another example of how you can use *AutoCAD Map 3D* to bring data together from a variety of sources to meet the needs of your project.

1. Open **City Taxlots.dwg** from the Chapter 08 folder.

This drawing contains the city taxlots file that you worked with in previous chapters. It also has the *Regional Taxlot* database attached and the links to the city taxlot centroids that you created in chapter 4.