Technical Paper
November 2001

CADD/GIS
Technology Center

Implementing the Spatial Data Standards (SDSFIE)/Facility Management Standards (FMSFIE), Release 2.00 Using AutoDesk, Inc. AutoCAD Map 2000i

The CADD/GIS Technology Center
for Facilities, Infrastructure, and Environment
Army Engineer Research and Development Center (at Vicksburg)
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

FOREWORD

The CADD/GIS Technology Center for Facilities, Infrastructure, & Environment (i.e., the Center) is responsible for the design, development and maintenance of the Spatial Data Standard for Facilities, Infrastructure, and Environment (SDSFIE), and the Facility Management Standard for Facilities, Infrastructure, and Environment (FMSFIE). These Standards are being developed so GIS and CADD users within the CADD/GIS community can easily transfer and communicate data and information. The FMSFIE is being designed to integrate with the SDSFIE and the A/E/C CADD Standards and will consider business processes and more detailed analysis and reporting data requirements. The SDSFIE was called the Tri-Service Spatial Data Standards (TSSDS) prior to July 1999). The FMSFIE was called the Tri-Service Facility Management Standards (TSFMS) prior to July 1999). The acronyms SDS and FMS were used from July 1999 until January 2001. The SDSFIE/FMSFIE Release 2.00 was completed in January 2001.

Table of Contents

Introduction	3
Implementation	6
Bibliography	45

1 Introduction

This paper provides basic information and instructions for implementing the SDSFIE/FMSFIE using AutoCAD Map GIS software. Additional information about the SDSFIE and FMSFIE is available from the CADD/GIS Technology Center at http://tsc.wes.army.mil.

GIS Software

The instructions are based upon the functionality and capabilities of AutoDesk AutoCAD Map 2000i (Release 4.5) GIS software. Additional information, and more detailed instructions, about AutoDesk AutoCAD Map are available at **http://www3.autodesk.com/adsk/0,,129446-123112,00.html**.

Database Software

The instructions are based upon the functionality and capabilities of Microsoft Access 2000 (Access) and Oracle 8.17 (Oracle) database software. Additional information, and more detailed instructions, about Access are available at **http://www.microsoft.com/ms.htm**. Additional information, and more detailed instructions, about Oracle are available at **http://www.oracle.com.**

Operating System

The SDSFIE/FMSFIE software applications are tested for operation on Microsoft Windows 95, 98, ME, NT 4.0, & 2000 operating systems. Microsoft Windows 2000 Professional (Windows) was the operating system used during the preparation of this tutorial.

SDSFIE/FMSFIE Release 2.00 Toolbox

The SDSFIE/FMSFIE Toolbox is the term used by the CADD/GIS Technology Center when referring to the suite of software applications developed to facilitate the use and implementation of the SDSFIE/FMSFIE. A brief explanation of the functionalities of each of the SDSFIE/FMSFIE Toolbox software applications is provided here. Additional information is available from the CADD/GIS Technology Center at **http://tsc.wes.army.mil**, and the SDSFIE/FMSFIE Release 2.00 CD-ROM.

Browser. The Browser application provides the capability to view and print the various components of the SDSFIE. AutoCAD Map is now available for selection from the GIS application software tab. When Map is selected AutoCAD color values are displayed on the screens for Entity, Entity Type and Feature. In previous releases these colors were displayed as Red/Green/Blue (RGB) values.

SQL Generator. The Generator is the 32-bit companion product to the Browser, designed specifically for use with Windows 95/98 and Windows NT operating systems. In addition to providing increased speed of Structured Query Language (SQL) code generation for use in constructing SDSFIE/FMSFIE compliant ANSI SQL (use with Intergraph RIS), Oracle SQL, Informix SQL, Microsoft SQL Server SQL databases, it offers a wider variety of generation options, as well as the capability to preview generated code and the ability to produce direct printed output as well as file output. The generator builds SDSFIE data sets in three phases. Each is capable of building the entire standard as well as some specific options permitting custom use.

Access Builder. This product is new to the SDSFIE/FMSFIE Release 2.00. It replaces, and expands, the capability

and functionality previously included in the Generator for building SDSFIE/FMSFIE compliant Access database tables. The Access Builder allows the user to build an Access database by selecting the needed SDSFIE/FMSFIE tables, attributes and domains from an interface similar to the Browser. The software then builds the database table structure (complete with join relationships).

Access Data Creator. This product is also new to release 2.00. It allows the user to populate an Access database without Access.

About AutoCAD Map

Simply put, AutoCAD Map is AutoCAD with one additional menu, the Map menu. Using Map a user can create, maintain, analyze, and produce mapping information. Map contains the object-oriented capabilities of AutoCAD software as well as its own unique spatial data management and multiple drawings access strengths. With Map, a user can digitize, maintain, analyze, and plot maps and maps sets, and create thematic maps and legends. A user can work with multiple drawings and use information from external data sources.

With Map a user can:

- Share files.
- Manage, retrieve, and store both graphic and nongraphic data.
- Link maps to associated databases.
- Add data to maps and make them more intelligent.
- Clean up maps.
- Build node, network, and polygon topologies for analysis.
- Produce thematic maps with legends.
- Work with existing spatial data in other coordinate systems and file formats.
- Import data from other CAD and GIS systems.
- Export data to other formats.
- Plot maps and map books easily and efficiently.

In addition to creating maps, Map also acts as a GIS, allowing a user to develop topologies, a series of defined relationships between nodes, links, and polygonal regions. A user can analyze this information and store polygonal or area-based data efficiently in topologies.

With Map, A user can also link map features with text data from a database and store the data in the drawing file as object data or in an external database. To find more information, a user can also define queries based on topology, as well as on object data or external database records.[1]

[1] Taken in whole or in part from AutoCAD Map 2000i Concepts; pp. 1-7

About Relational Databases

Database Management Systems (DBMS) are used to organize and tabular information for retrieval and manipulation by multiple users and application programs. The RDBMS simplifies the structure with rows or columns of information. Structured Query Language (SQL) is the American National Standards Institute (ANSI) standard relational database communication language. The SDSFIE/FMSFIE SQL Generator provided with the CD release of version 2.00 of the SDSFIE/FMSFIE produces SQL statements that can be used to populate blank tables for various types of RDBMS including Standard ANSI, Microsoft SQL, Informix, and Oracle.

Version 2.00 of the SDSFIE/FMSFIE introduced a separate tool for creating and maintaining Microsoft Access databases. This SDSFIE/FMSFIE Access Builder not only performs many of the functions of the SQL Generator specifically for Microsoft Access, but also permits analysis and modification of the Access Schema, including definitions, domains and values, and expanded relationships. The new tool is also useful in upgrading from one SDSFIE/FMSFIE Release to the next.

About Access

Microsoft Access is an interactive database management system designed for the Microsoft Windows operating system. Access has the ability to integrate data from spreadsheets and other database formats. The user can directly import, export, and create relationships to: Microsoft Excel version 3.0 or later, Microsoft Fox Pro version 2.x or later, Microsoft SQL Server, Borland dBASE III Plus, Borland dBASE IV, Borland dBASE version 5.0, Borland Paradox version 3.0 to 5.0, Microsoft Visual FoxPro version 3.0, Lotus 1-2-3, ASCII text and all ODBC-compliant databases. Access provides the ability to convert data or reports into HTML so the user can create interactive databases and share them across an Intranet or the World Wide Web.

Microsoft Access takes advantage of the graphical user interface power and ease of use in Windows, giving the user visual access to data and simple, direct ways to view and work with information.

Access provides querying and connective capabilities that allow the user to find desired information regardless of format or location. With the use of SQL queries, the user can work with data stored in different database formats and network locations. The user can easily edit SQL statements at any time and view different layouts of data.

Design tools included with Access allow the user to produce forms and reports to meet exact specifications. One can plot data, combine different forms and reports in one document, and present reports with publication-quality style.

Microsoft Access provides integration with Microsoft Visual Basic. Integrated Development Environment (IDE) features drag-and-drop code, color-coded syntax, a debug window, and in-place object browsing. Visual Basic for Applications – the programming language shared across all Microsoft Office applications – provides programming, interface, and debugging tools.

2 Implementation

Tutorial

This tutorial will outline the steps necessary to set up a SDSFIE/FMSFIE compliant database and attach it to a GIS (i.e., Map). Mock data for a storm sewer system will be imported into Access and attached to an existing AutoCAD drawing file. The following files have been delivered with this document for the tutorial.

V-XPTUT1.DWG – Survey drawing of the existing site plan
U-XPTUT1.DWG – Utility drawing of the Storm water piping plan
Storm_pipe.txt – field collected data for the storm piping
Curb_inlet.txt – field collected data for the curb inlets

From Windows Explorer create the folder C:/acmaptut and copy the tutorial files into it.

Obtaining Standard Symbology

Within the SDSFIE/FMSFIE electronic deliverable the following symbology is provided:

AutoCAD Blocks, each in an individual drawing file (.dwg).
Patterns in a pattern library file (.pat).
Multilines in a multiline library file (.mln).
Custom line styles in a linetype library file (.lin).

These files are stored in the directory /AutoCadSym.200. They are also available from the CADD/GIS Technology Center's home page at **http://tsc.wes.army.mil**. Additional information pertaining to the use of these files is also available from the Center in a technical report titled A/E/C CADD Standard, dated October 1999.

Implementation Preparation

The first step in the implementation process is to perform an inventory of spatial data files requiring SDSFIE/FMSFIE compliance. A simple listing in a text file or spreadsheet serves well as a method to organize the data inventory.

Next, select the features in the SDSFIE/FMSFIE that correspond to features in your existing data set. The SDSFIE/FMSFIE Browser tool will help with the feature selection process. This tool allows the user to browse compliant features by structure, feature name, key word, or data source. The following steps demonstrate how to use the SDSFIE/FMSFIE Release 2.00 Browser application to find a few different features that would be included in a utilities spatial data set.

Using the SDSFIE FMSFIE Browser

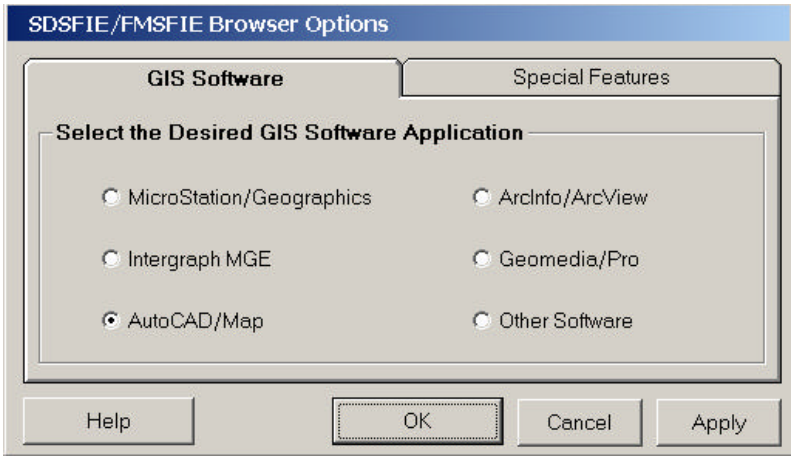
To open and configure the browser

From the Windows Start Menu choose SDS FMS Browser

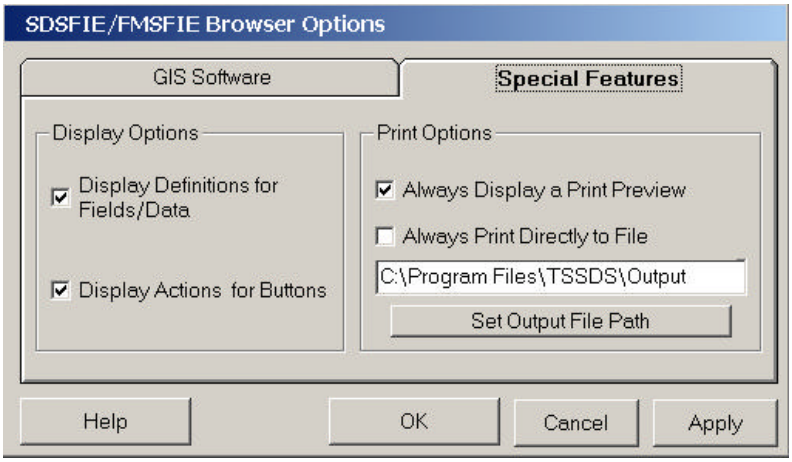
1. From the Configure menu choose Connect.

2. Verify and /or change the location of the data connection files and choose Connect, Test and Save.

3. From the Configure menu choose Options.



4. From the GIS Software tab choose AutoCAD/Map, then choose Apply.



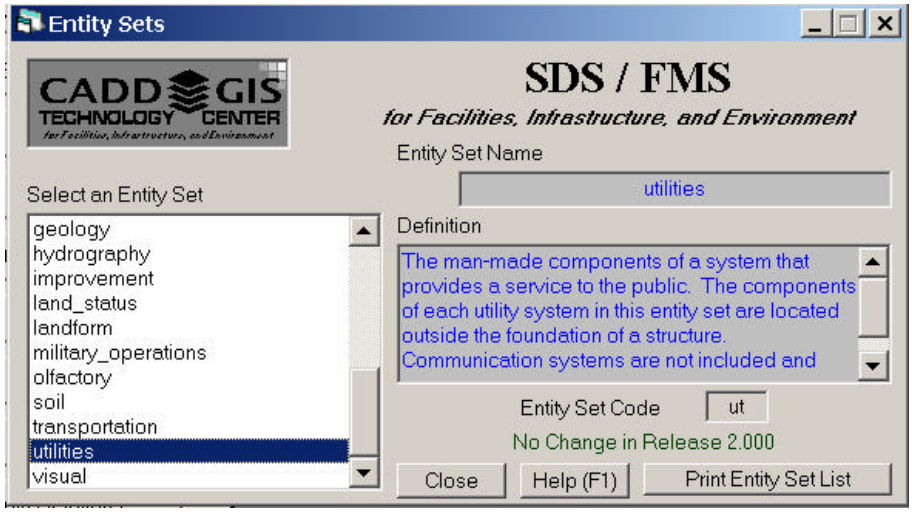
5. From the Special Features tab choose the appropriate settings, then choose OK.

To browse by Structure

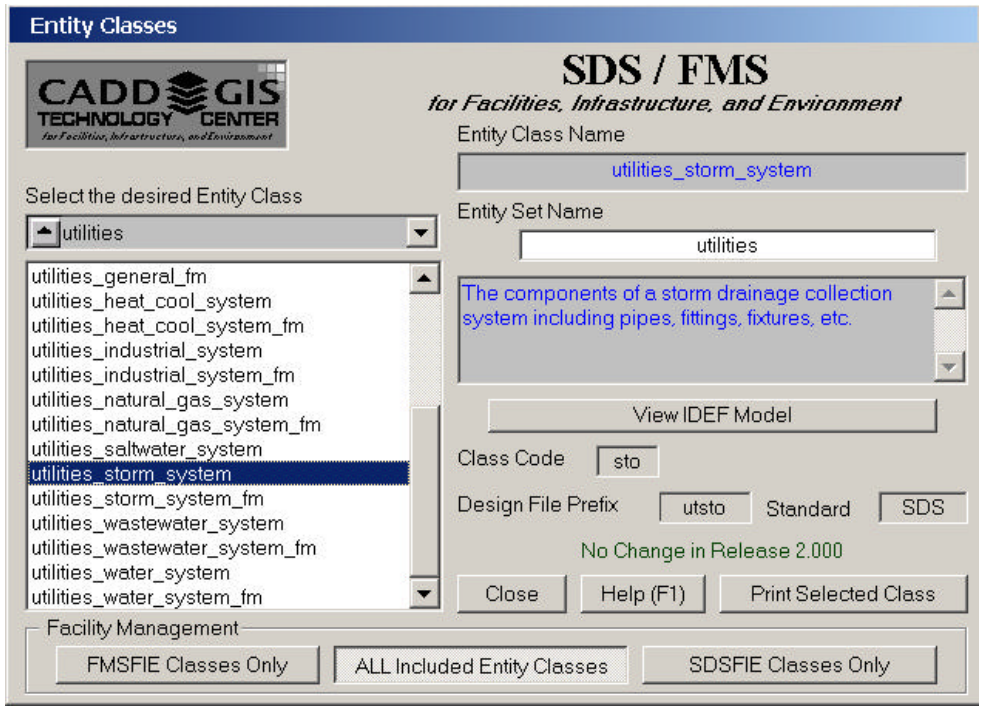
Now look at all the Entity Classes in the Utilities entity set.

1. From the Browse menu choose By Structure.

2. Choose Entity Sets, then double-click on utilities from the Entity Set window.



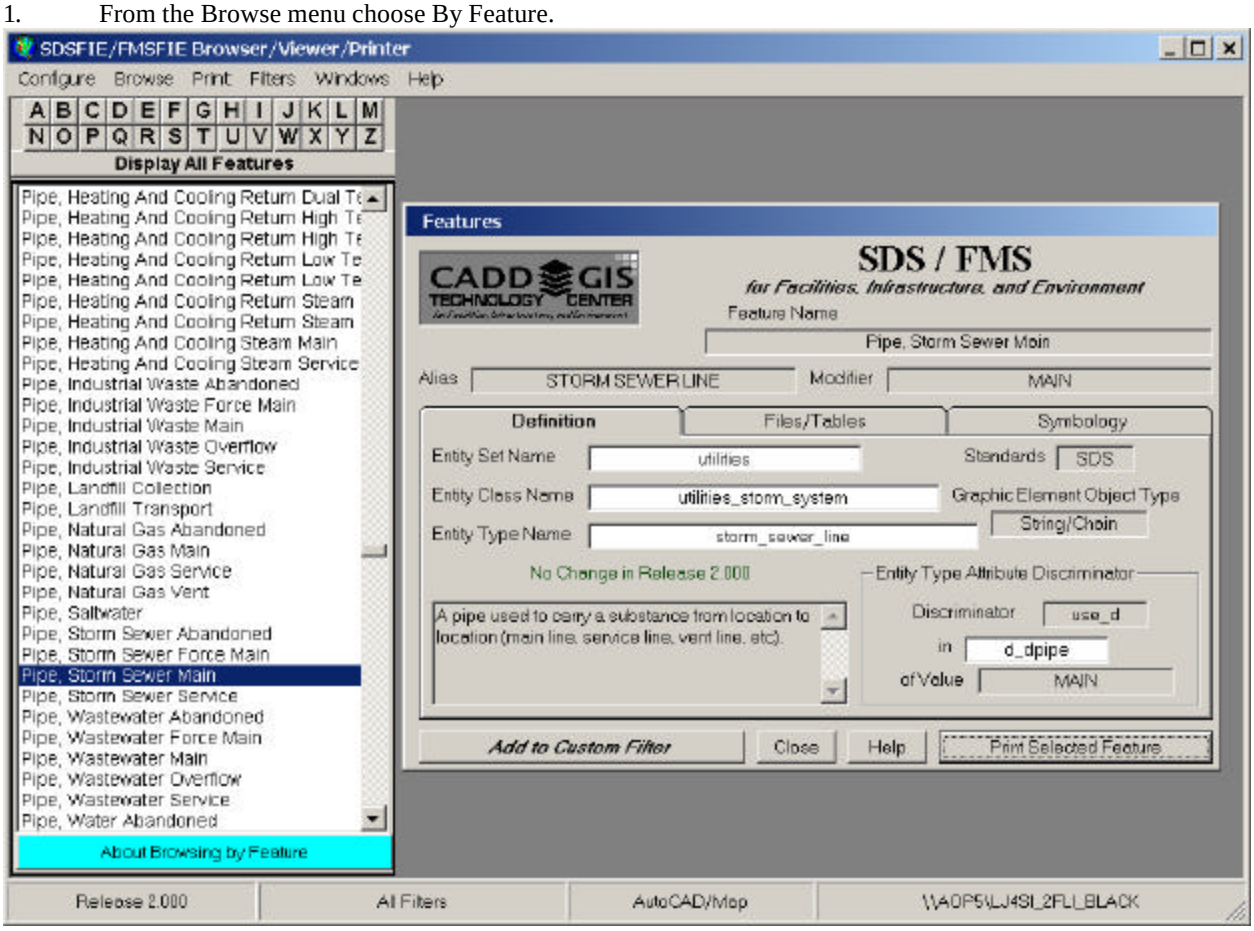
3. Double-click on utilities_storm_system to view the full definition.



To browse By Feature

Now find the entity definition for a stormwater pipe

1. From the Browse menu choose By Feature.



2. Double Click on Pipe – Storm Sewer Main in the features list to display the Entity Set, Entity Class, Entity Type, attribute table name and symbology for a stormwater pipe.

To browse by Keyword

Now find information about a curb inlet.

1. From the Browse menu choose By Keyword.

2. Enter “curb inlet” into the “Search For” field.

3. Double-click on Feature name – CURB INLET in the keyword search results list to display the Entity Set, Entity Class, Entity Type, attribute table name and symbology for a curb inlet.

To browse by Data Source

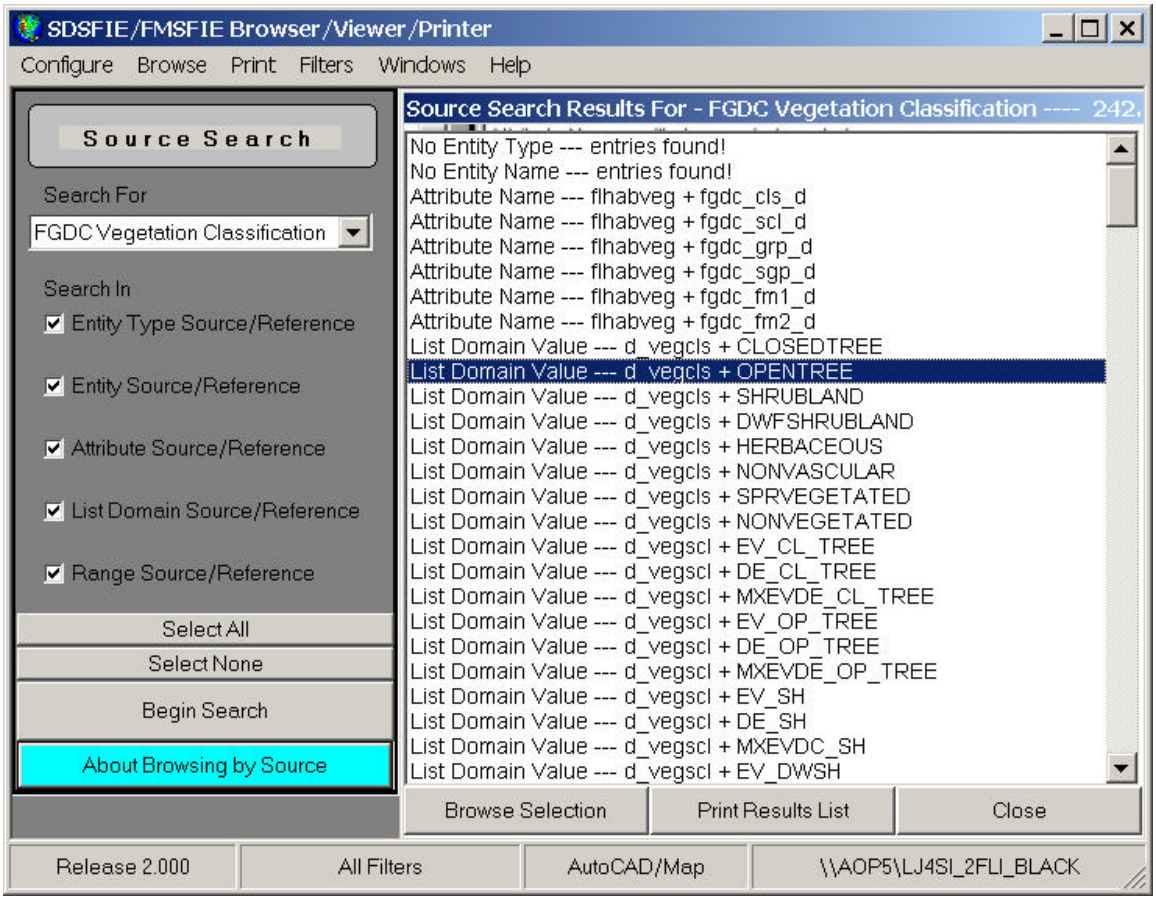
1. Now determine which domain table contains the FGDC vegetation classification for opentree.

2. From the Browse menu choose Data Source

3. Select FGDC Vegetation Classification from the Search for drop down list.

4. Select all the Search in options, then choose Begin Search.

5. Double-click the list domain value d_vegcls + opentree to view the domain table name, values and definitions.



Continue using the Browser to gather pertinent information.

Using the Filter Maker

The Filter Maker permits the development, definition, modification, implementation, and saving of a Filter, or subset of the entire SDSFIE Library. A filter is used to limit the size of the data schema used as a part an SDSFIE/FMSFIE data implementation. Filters limit display and use of all aspects of the SDSFIE to include Entity Sets, Classes, and Types, as well as Tables, Attributes, and Domains. A custom filter is a user-defined filter. Although the creation of a custom filter is optional, it will greatly increase the efficiency of the SDSFIE/FMSFIE database generation process.

For the purpose of this tutorial a filter named "Storm" will be developed. The steps outlined in the following section guide the user through the tasks necessary to create the filter. *Note: SDSFIE/FMSFIE data does not support filter operations with pre-TSSDS/TSFMS 1.80 releases.

To open the Filter Maker and create a filter

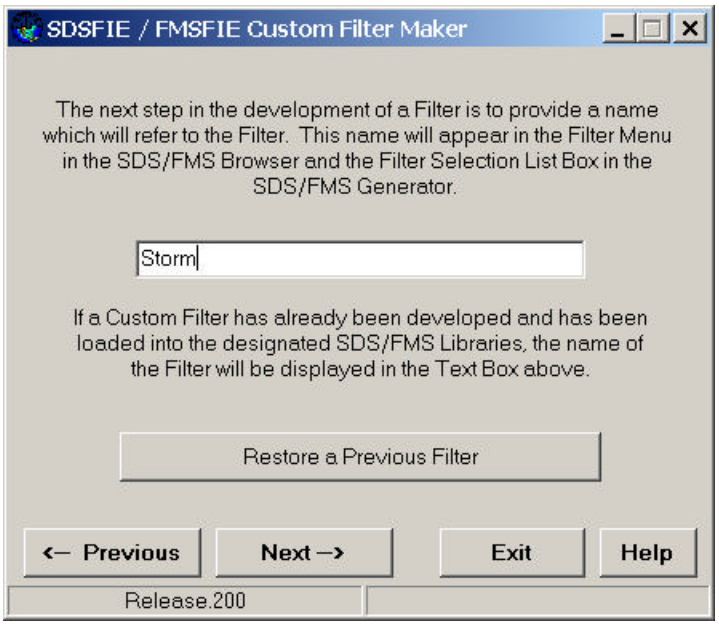
1. From the Windows Start Menu choose Filter Maker.

2. Choose Connect to SDSFIE/FMSFIE Library.

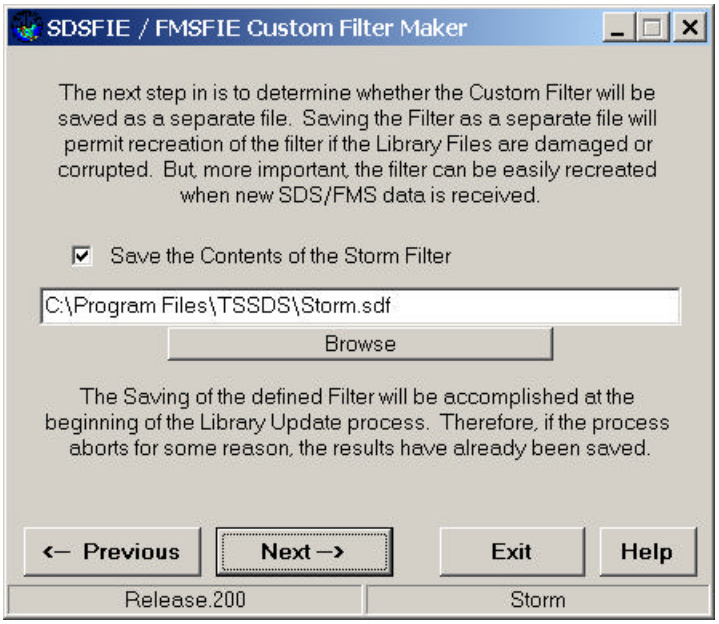
3. Verify and /or change the location of the data connection files and choose Connect, Test and Save.

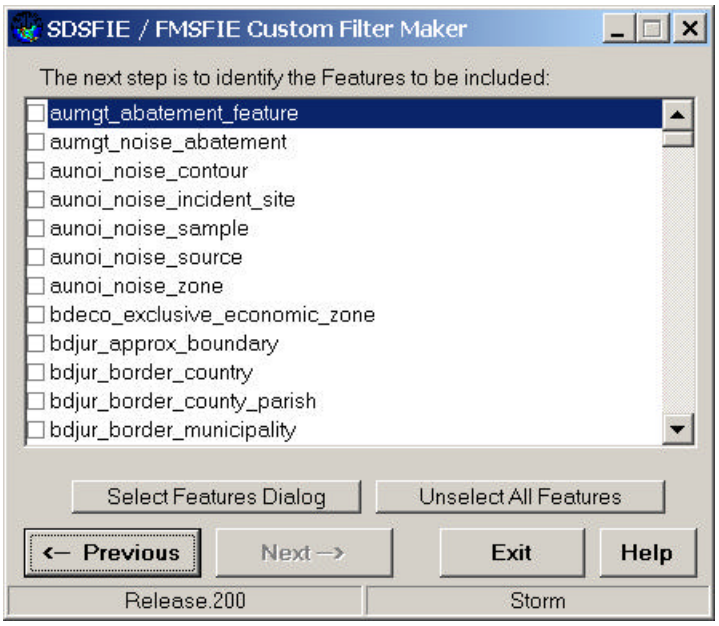
4. Choose Create a new filter, then choose Next.

5. For the filter name enter Storm, then choose Next.

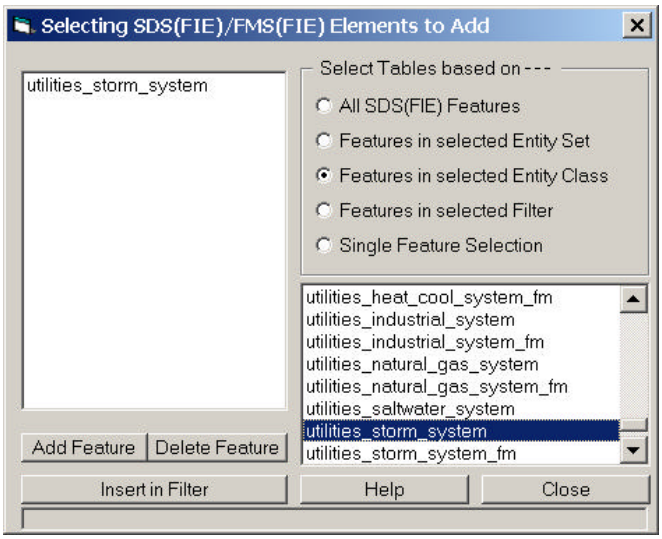


6. Choose Save the contents of the storm filter, verify and /or change the location of the filter, then choose Next.

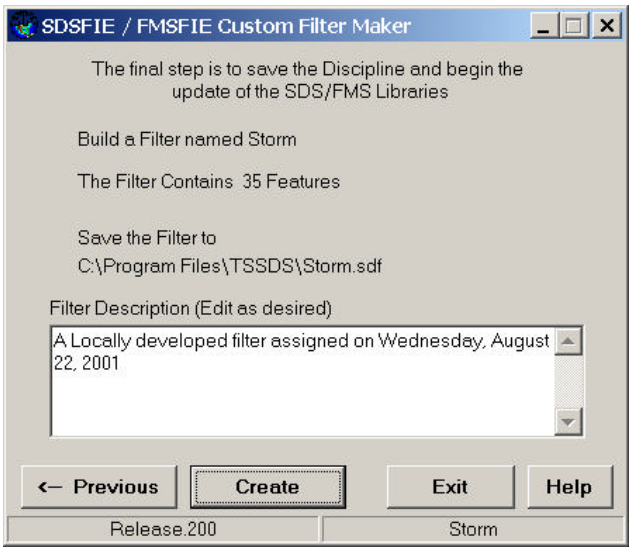

SDSFIE / FMSFIE Custom Filter Maker
The next step in is to determine whether the Custom Filter will be saved as a separate file. Saving the Filter as a separate file will permit recreation of the filter if the Library Files are damaged or corrupted. But, more important, the filter can be easily recreated when new SDS/FMS data is received.
Save the Contents of the Storm Filter
C:\Program Files\TSSDS\Storm.sdf
Browse
The Saving of the defined Filter will be accomplished at the beginning of the Library Update process. Therefore, if the process aborts for some reason, the results have already been saved.
<— Previous
Next —>
Exit
Help
Release.200
Storm

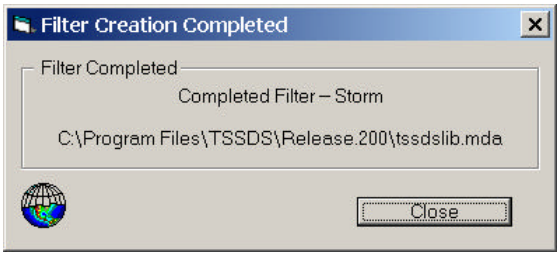

SDSFIE / FMSFIE Custom Filter Maker
The next step is to identify the Features to be included:
aumgt_abatement_feature
aumgt_noise_abatement
aunoi_noise_contour
aunoi_noise_incident_site
aunoi_noise_sample
aunoi_noise_source
aunoi_noise_zone
bdeco_exclusive_economic_zone
bdjur_approx_boundary
bdjur_border_country
bdjur_border_county_parish
bdjur_border_municipality
Select Features Dialog
Unselect All Features
<— Previous
Next —>
Exit
Help
Release.200
Storm

1. Choose Select Features Dialog, choose Features in selected Entity Class, then double-click utilities_storm_system. Choose Insert in Filter.



2. Choose Next, then Create.





3. Once the filter maker has completed the storm filter option will be available in the SDSFIE/FMSFIE Browser application. However this will not take effect until the SDSFIE/FMSFIE Browser application is restarted.

Erasing a Filter

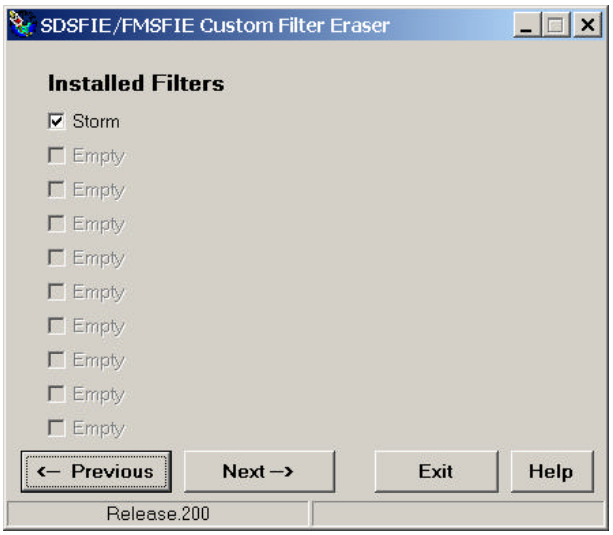
The Filter Eraser is used to restore the SDSFIE/FMSFIE Library to its original configuration. It operates very similar to the Filter Maker (Wizard). The following steps are to be used in erasing a user created custom filter (*Note: the SDSFIE/FMSFIE Filter Eraser is a separate program like the Filter Maker)

1. From the Windows Start Menu choose Filter Eraser.

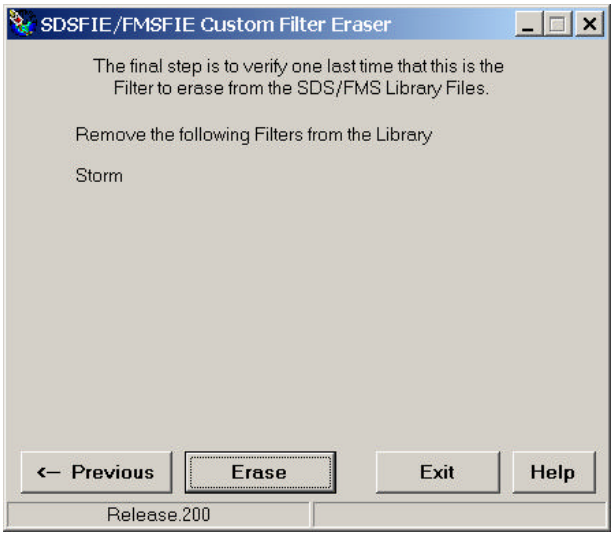
2. Choose Connect to SDSFIE/FMSFIE Library.

3. Verify and /or change the location of the data connection files and choose Connect, Test and Save, then choose Next.

4. Choose the filter storm, then choose Next.



5. Choose Erase.



Using the Access Database Builder

New to release 2.00 of the SDSFIE/FMSFIE is the Access Database Builder. This tool automatically builds the structures (tables, attributes, and domains) of Access in accordance with the Spatial Data Standards. It replaces and expands on the functionality of the SDSFIE/FMSFIE Generator Tool first introduced in Release 1.600 of the TSSDS. This tutorial will use the builder to create a database structure used to store field captured data pertaining to the stormwater collection system.

To open and build a database

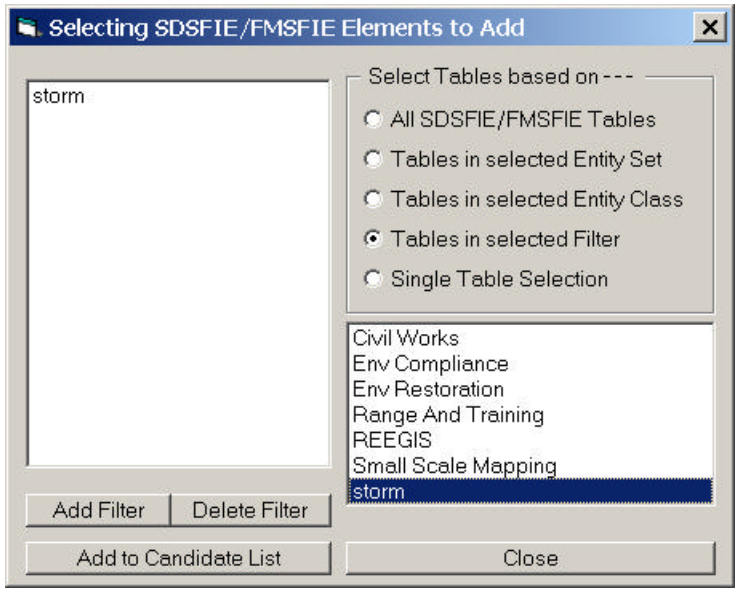
1. From the Windows Start Menu choose Access Builder.

2. From the Open menu choose Create Access Database.

3. For the database name enter storm, then choose OK.

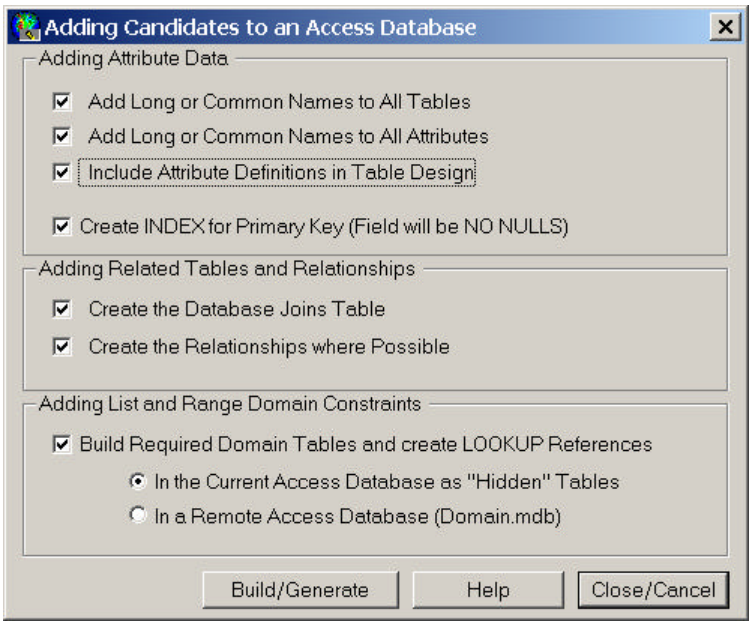
4. Choose Tables in Selected Filter and double-click storm to add all the storm system features to the Candidates List.

5. Choose Add to Candidate List.



6. From the Action menu choose Add Candidates to Access.

7. Choose Build/Generate to convert the candidates to Access Tables.



Populating the SDSFIE/FMSFIE database

The next step in the implementation process is populating the database. Notice that when "Storm.mdb" was created, it was an empty database. To use the database a user must populate it with the appropriate data. The ASCII database files Storm_pipe.txt and Curb_inlet.txt contain field-collected attributes for the project. The following steps will populate the database.

To open and convert the database to the latest version.

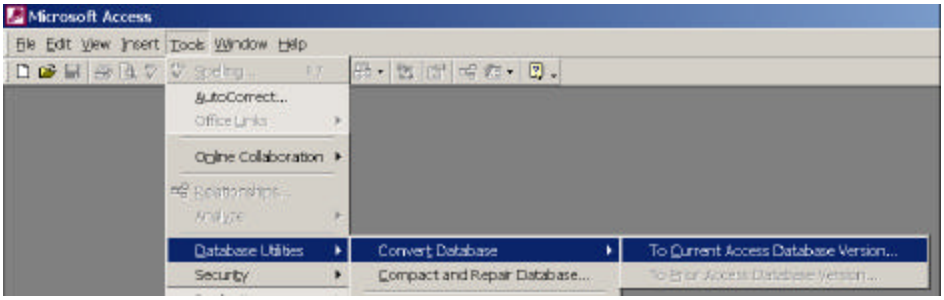
This step is required since the Access Builder constructs an Access database in Access 97 format.

1. From the Windows Start Menu choose Microsoft Access 2000.

2. From the Tools menu choose Database Utilities > Convert Database> To Current Access Database Version.

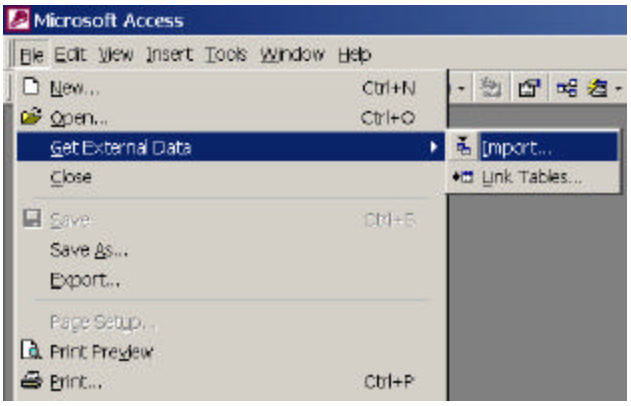
3. Navigate to the correct folder and select Storm.mdb. Save the new database as Storm2000.

4. From the File menu choose Open, then choose Storm2000.mdb.

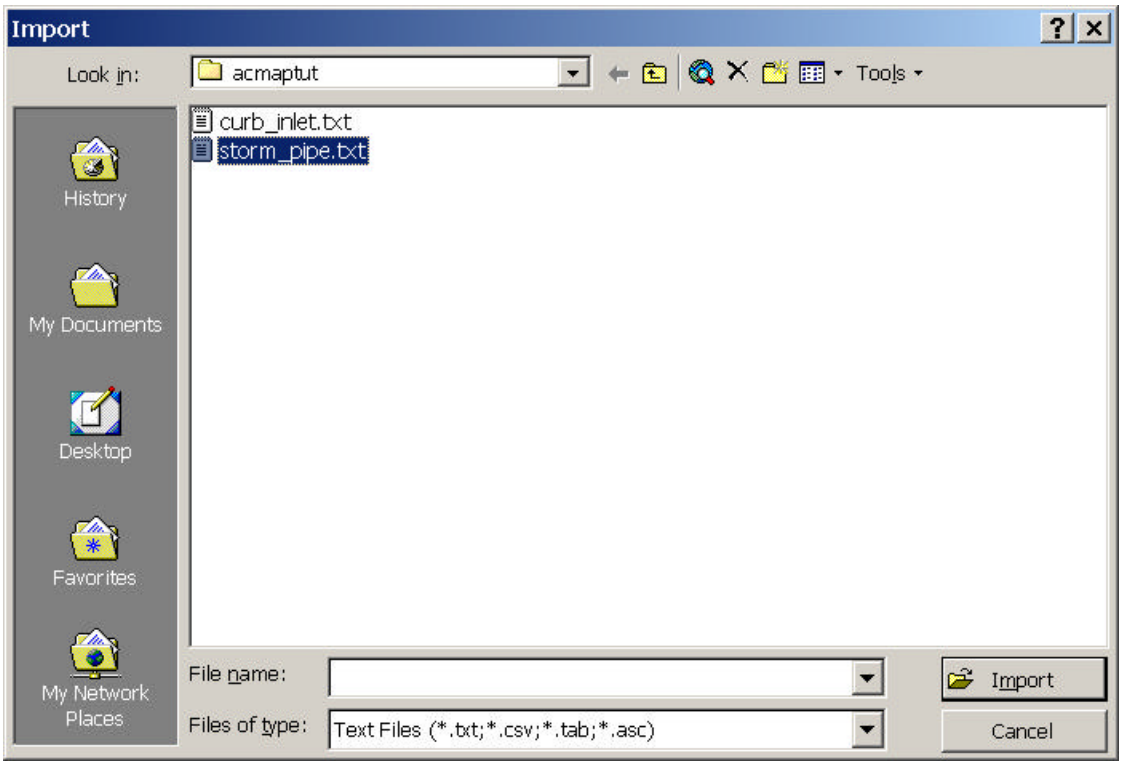


To import the data

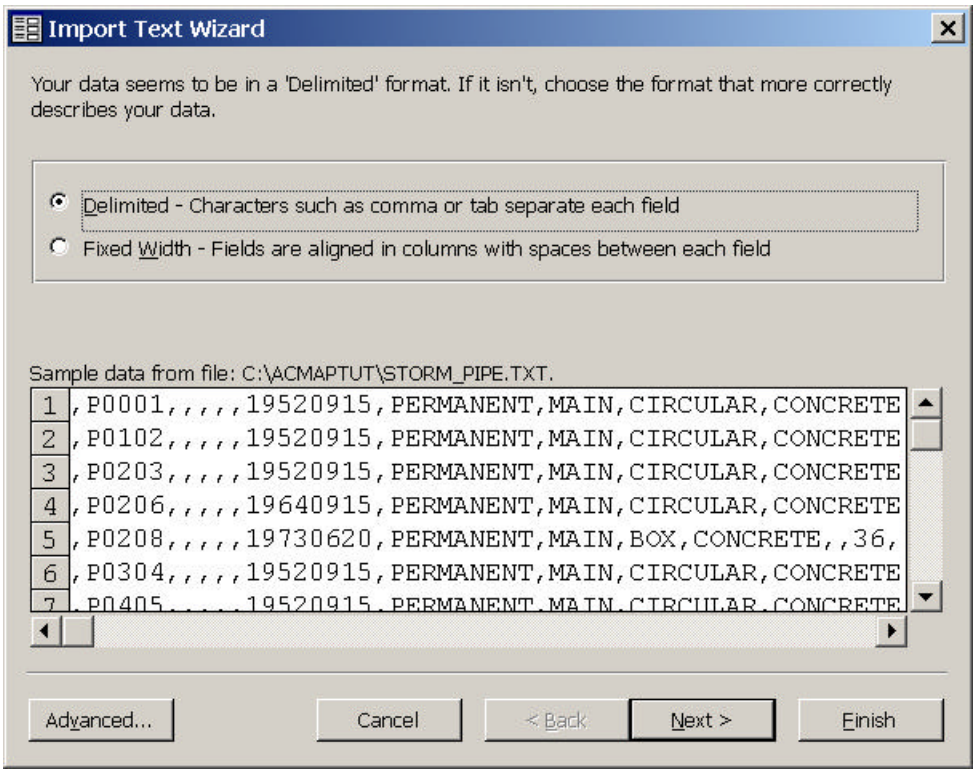
1. From the File menu choose Get External Data> Import.



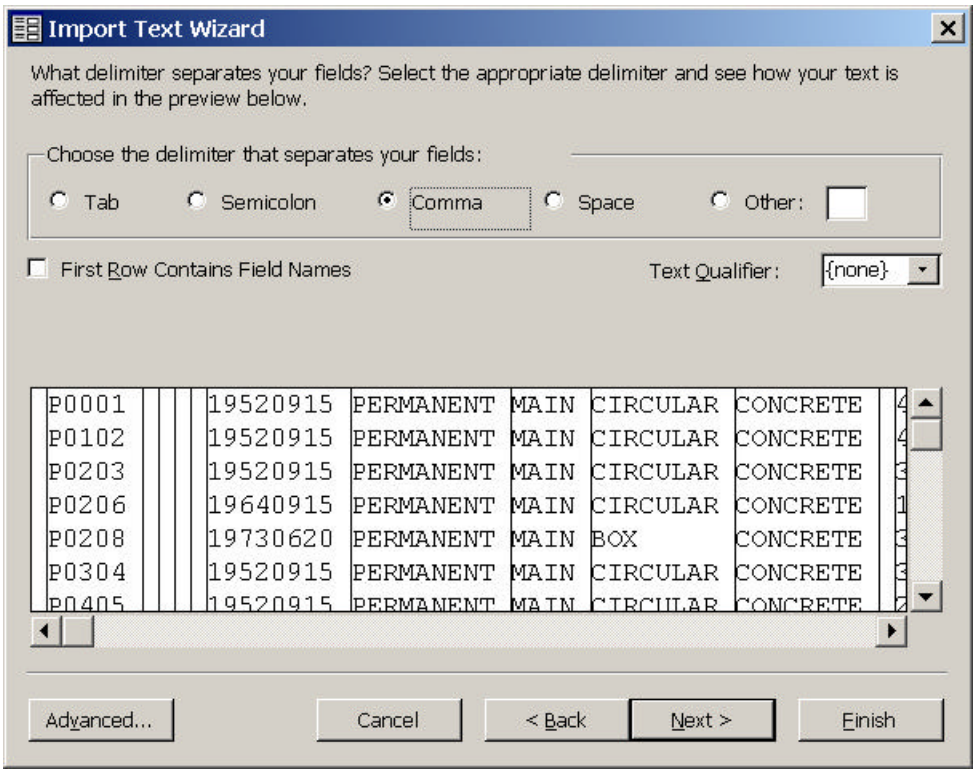
2. Change the file type to Text Files and import storm_pipe.txt.



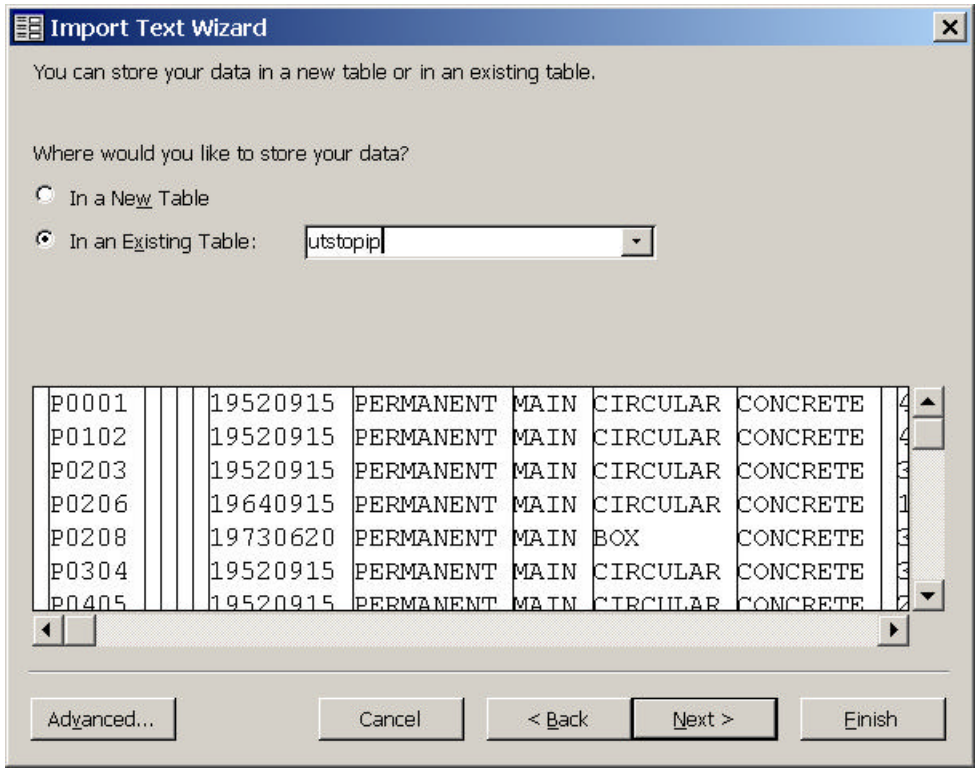
3. Choose Delimited, then choose Next.



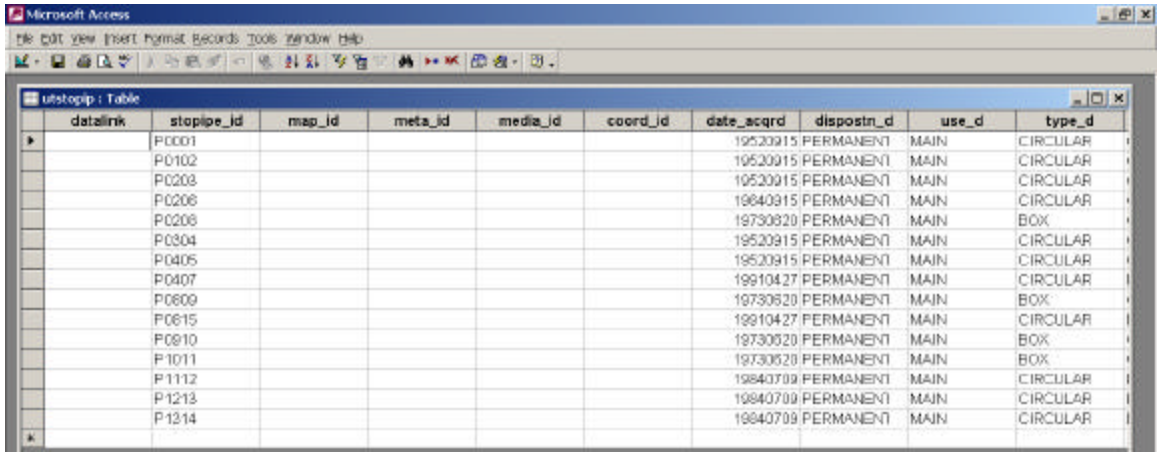
4. Choose Comma as the delimiter, then choose Next.



5. Choose In an Existing Table, then choose the table utstopip from the dropdown list. Choose Finish.



6. Open table utstopip to view the data.



7. Repeat the process for table utstoinl using the text file curb_inlet.txt.

Using the Access Data Creator

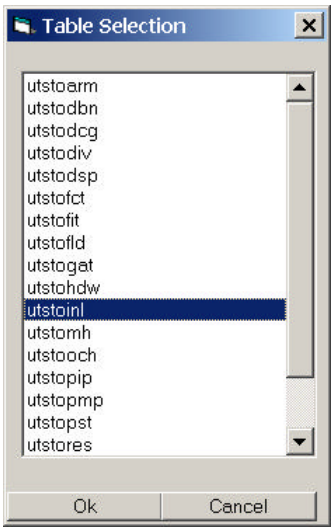
Use the Access Data Creator to populate a database without using Access. Open curb_inlet.txt in Notepad or Excel and leave open during the next few steps.

To open the database and select a table

1. From the Windows Start Menu choose Access Data Creator.

2. From the Database menu choose Open, then navigate to C:/acmaptut and open storm.mdb.

3. Choose the table utstoinl, then choose OK.

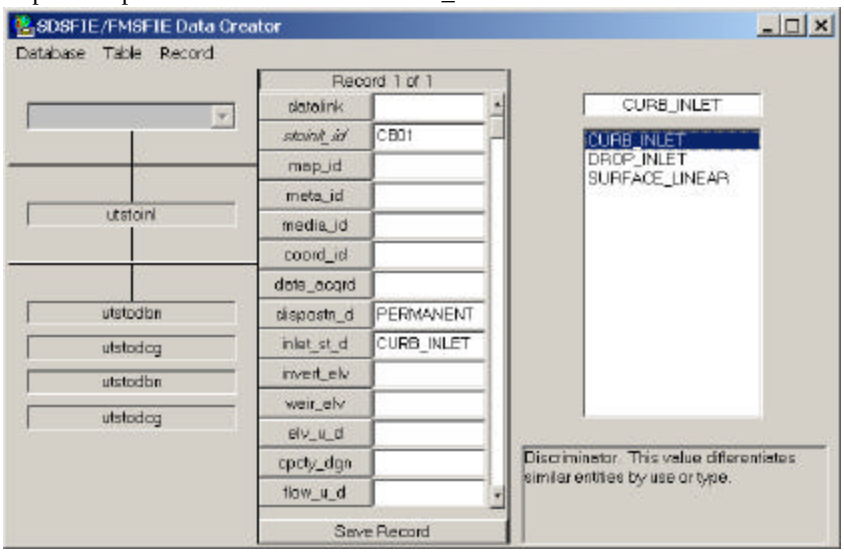


To add a record

1. From the Record menu choose New.

2. Enter data as shown below. Choose save record when finished.

3. Repeat the process for all the data in curb_inlet.txt.



4. From the Database menu choose Exit to close the program.

AutoCAD Map Implementation

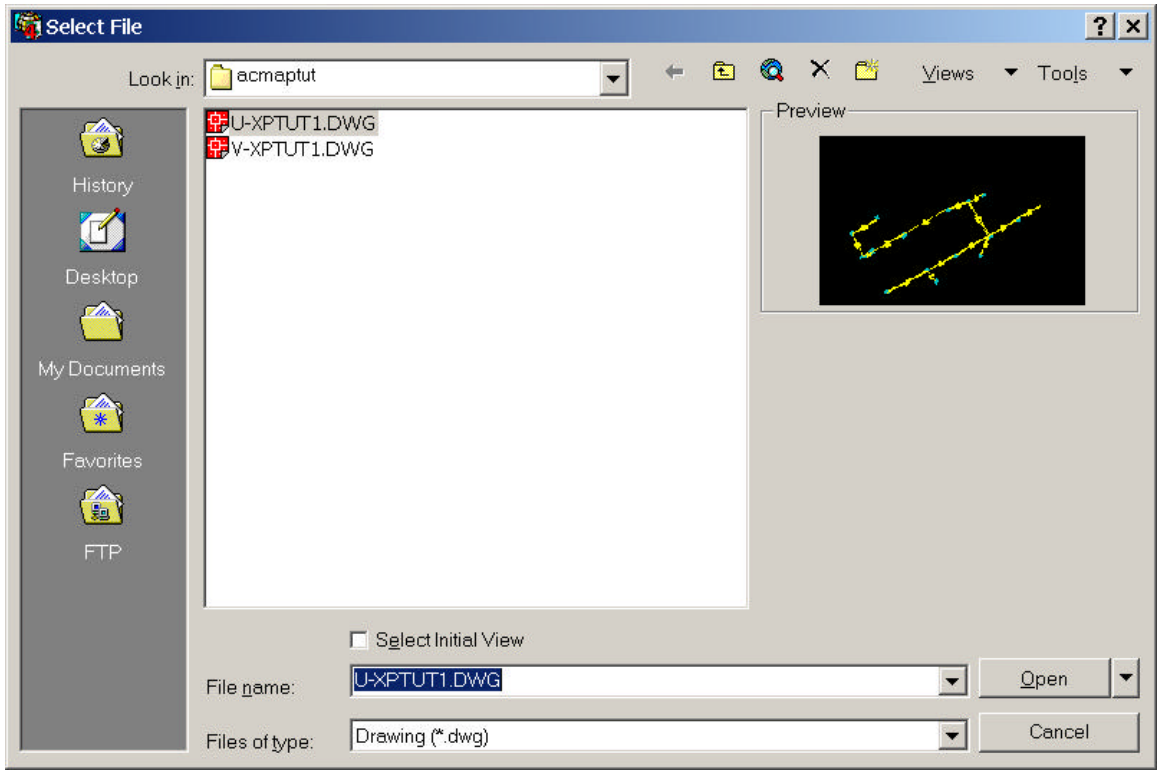
The next step is to attach the data source to the GIS. Attach an Access database to Map by simply dragging the database file onto the Project Workspace (the Explorer like window to the left of the drawing area). Map automatically creates the files needed to communicate with Access. When reading external database files Map uses drivers to translate the data to a standard format. The first time you use a data source Map determines the appropriate driver and stores this information, along with the location and type of data source, in a Universal Data Link (UDL) file.

To open Map and attach a database

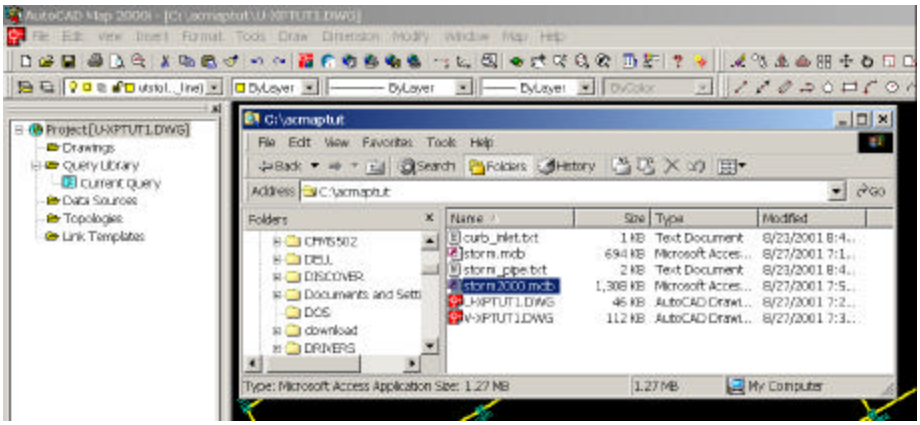
1. From the Windows Start Menu choose AutoCAD Map 2000i.

2. From the File menu choose Open.

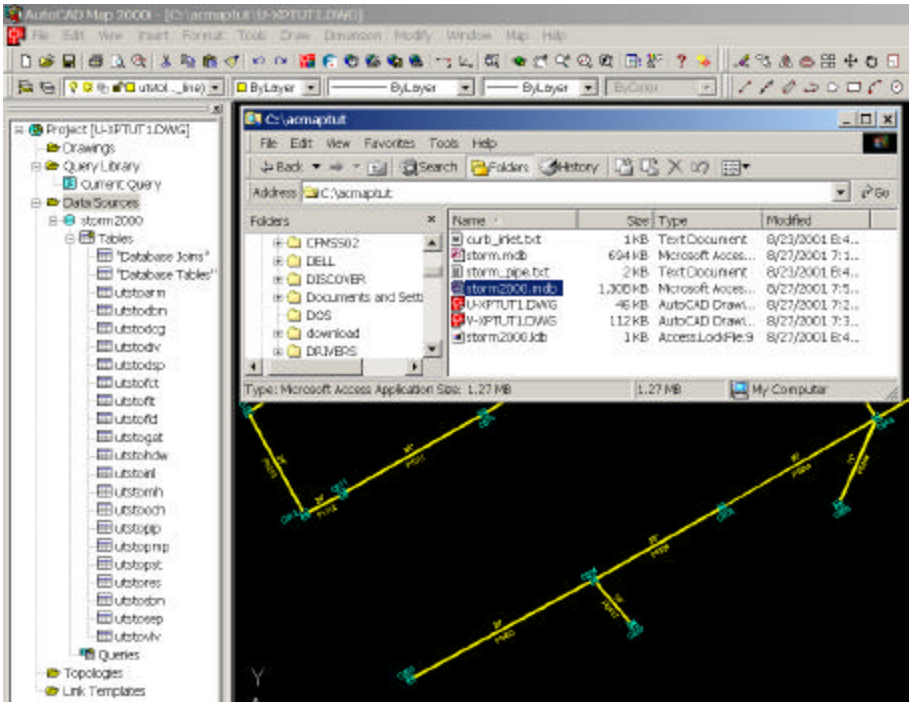
3. Open U-XPTUT1.DWG.



4. Open an Explorer window in front of Map and navigate to C:/acmaptut.



5. Drag Storm2000.mdb from the window into the Map Project Workspace.



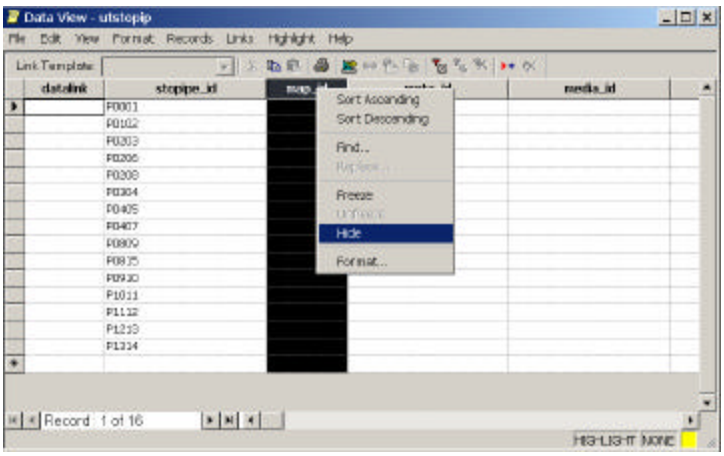
The tables are now listed under the data source storm2000 in the Project Workspace.

Using data view to view, hide and resize columns

1. Double-click on table utstopip from the storm2000 data source.

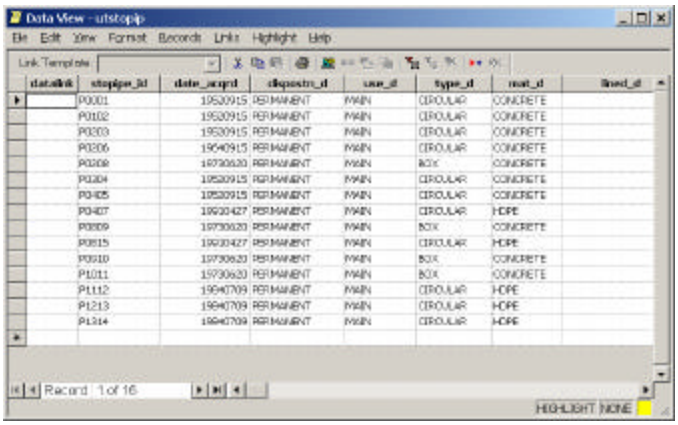
For this Tutorial, we will only work with the table "utstopip", and are not using the foreign key joins to other related SDSFIE/FMSFIE relational database tables (e.g., "map_id", "meta_id", "media_id", & "coord_id"). The SDSFIE/FMSFIE Compliance Policy provides complete information and guidance concerning refining and customizing SDSFIE/FMSFIE database tables.

2. Right-click on the column heading map_id and choose hide from the menu.



3. Do the same for columns meta_id, media_id and coord_id.

4. Resize the columns by placing your cursor between the column headings and dragging left or right.



The sort and filter functions are also available in Data View.

To edit data

1. Right-click on table utstopip from the storm2000 data source.

2. Choose Edit Table from the menu.

3. Make edits as necessary to the fields in the table, then close the table.

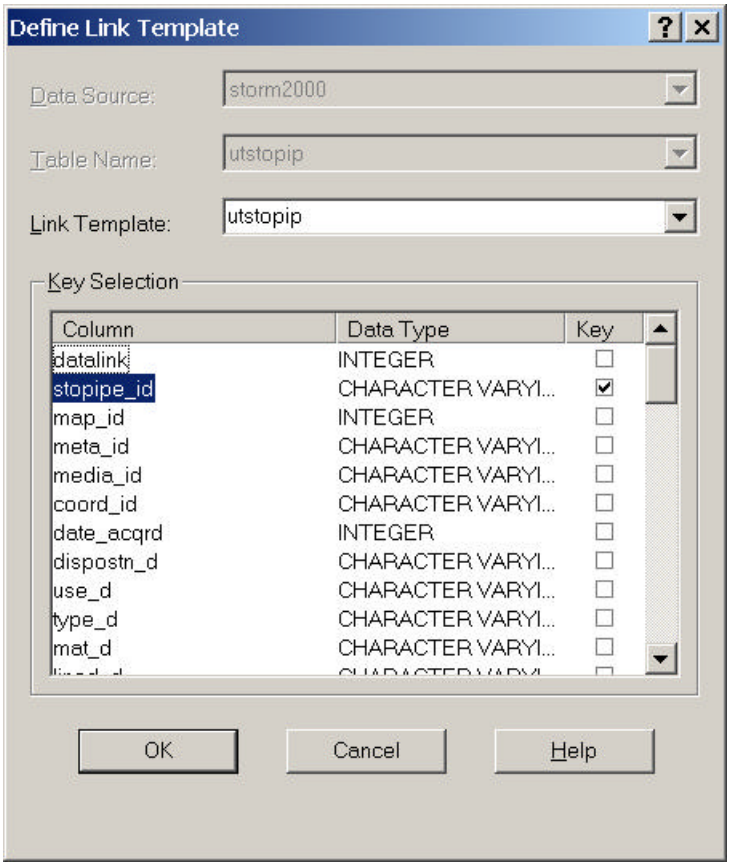
To define a Link Template

When a drawing object is linked to a record in a database, link data is stored on the object, creating a relationship between the database table and the object. Map keeps track of these relationships using Link Templates. The Link Template stores the data source, table name and key column for a relationship.

1. Right-click on table utstopip from the storm2000 data source.

2. Choose Define Link Template from the menu.

3. Choose stopipe_id as the key column, then choose OK.

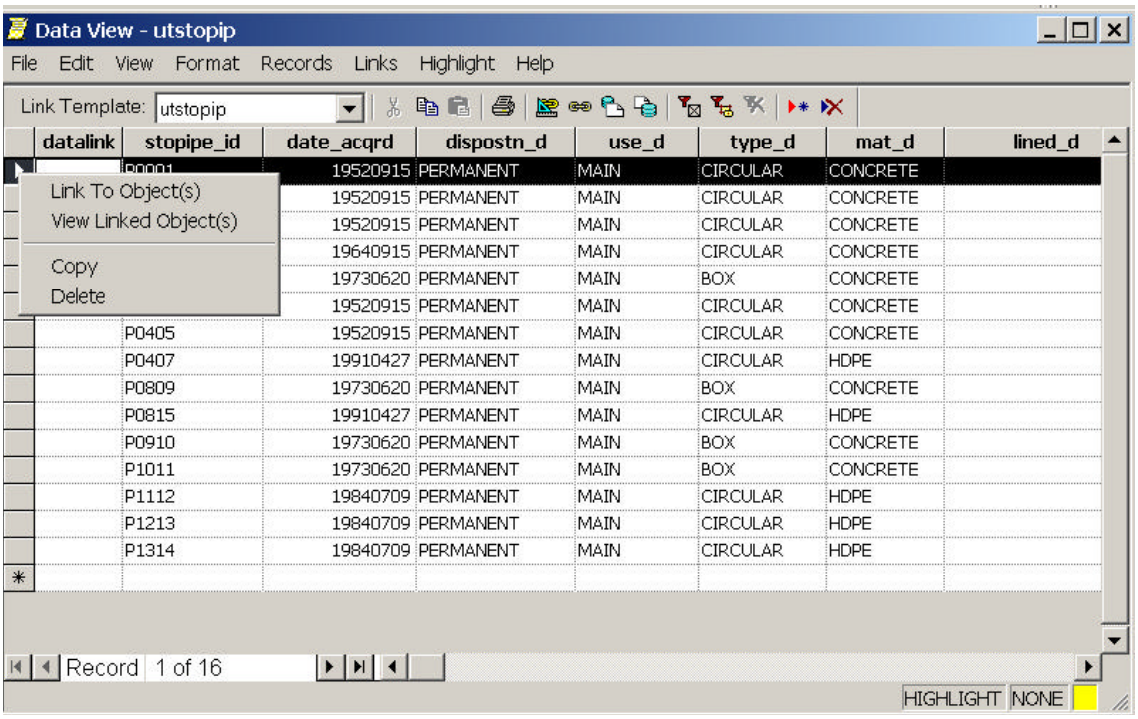


To link a drawing object to a record

1. Double-click on table utstopip from the storm2000 data source.

2. Highlight the first record (P0001) by choosing the box at the beginning of the row.

3. Right-click on the first record (P0001) and choose Link to Object(s).



datalink	stopipe_id	date_acqrd	dispostn_d	use_d	type_d	mat_d	lined_d
	P0001	19520915	PERMANENT	MAIN	CIRCULAR	CONCRETE	
		19520915	PERMANENT	MAIN	CIRCULAR	CONCRETE	
		19520915	PERMANENT	MAIN	CIRCULAR	CONCRETE	
		19640915	PERMANENT	MAIN	CIRCULAR	CONCRETE	
		19730620	PERMANENT	MAIN	BOX	CONCRETE	
		19520915	PERMANENT	MAIN	CIRCULAR	CONCRETE	
	P0405	19520915	PERMANENT	MAIN	CIRCULAR	CONCRETE	
	P0407	19910427	PERMANENT	MAIN	CIRCULAR	HDPE	
	P0809	19730620	PERMANENT	MAIN	BOX	CONCRETE	
	P0815	19910427	PERMANENT	MAIN	CIRCULAR	HDPE	
	P0910	19730620	PERMANENT	MAIN	BOX	CONCRETE	
	P1011	19730620	PERMANENT	MAIN	BOX	CONCRETE	
	P1112	19840709	PERMANENT	MAIN	CIRCULAR	HDPE	
	P1213	19840709	PERMANENT	MAIN	CIRCULAR	HDPE	
	P1314	19840709	PERMANENT	MAIN	CIRCULAR	HDPE	

4. Choose the line that represents pipe 0001, then ENTER.

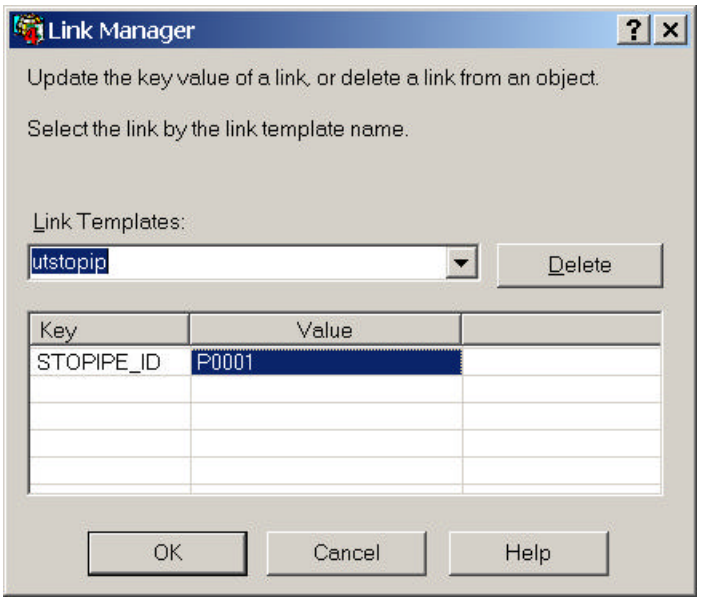
5. Repeat step 4 until all of the records have been linked to objects.

Now that the piping is complete try using the above process for the curb inlets. Use table utstoinl from the storm2000 data source. Attach the records to the curb inlet blocks (named usincb).

To verify link template information

Map attaches the key column value from the external database to the drawing object and stores it in the drawing. This information can be used to automatically reconnect drawing objects to their appropriate database records in the event an external database is moved or deleted.

1. From the Map menu choose Database, then Link Manager.
2. Select a pipe.

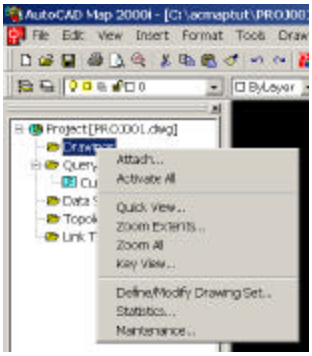


To create a project

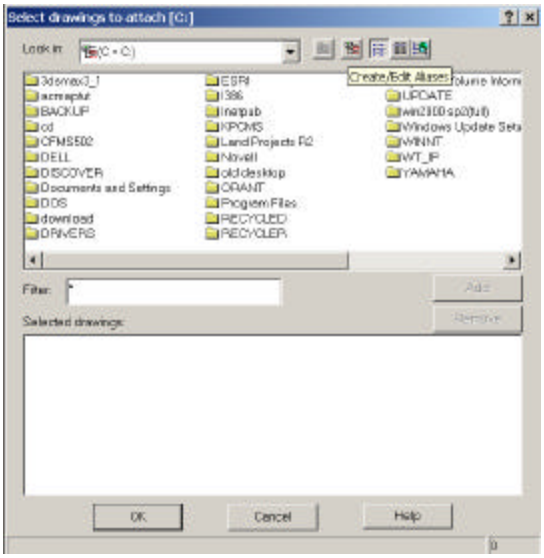
1. From the Windows Start Menu choose AutoCAD Map 2000i.
2. From the File menu choose Saveas. Save the drawing as PROJ001.DWG in C:/acmaptut. This is now your project drawing.

To attach drawings to a project

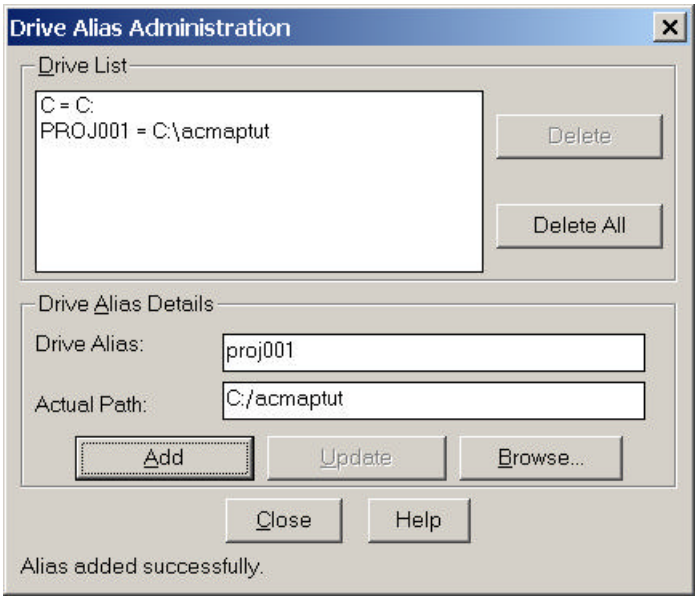
1. Right-click on Drawings in the Project Workspace and choose Attach.



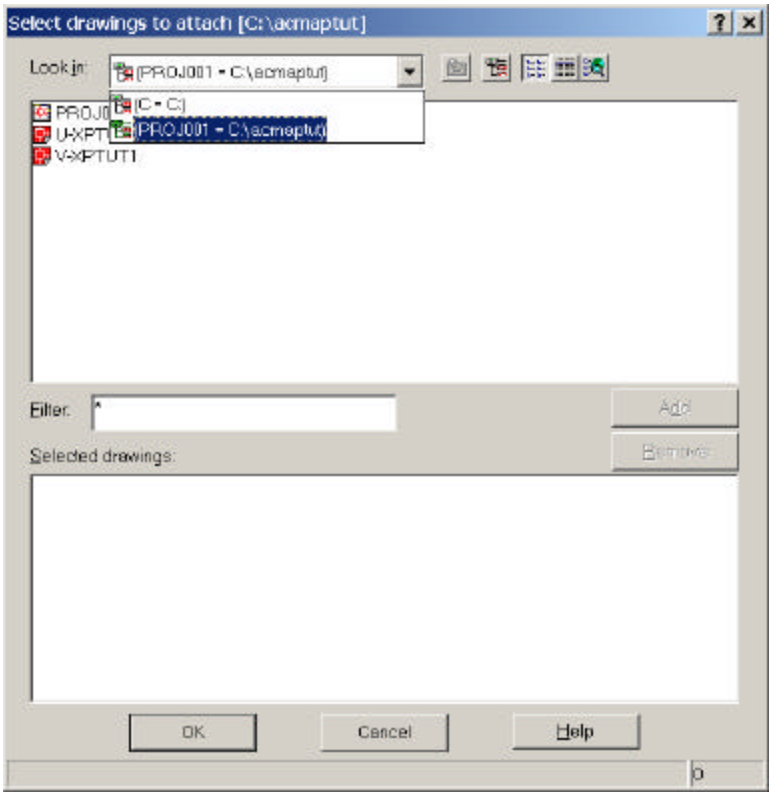
2. Choose Create/Edit Drive Aliases.



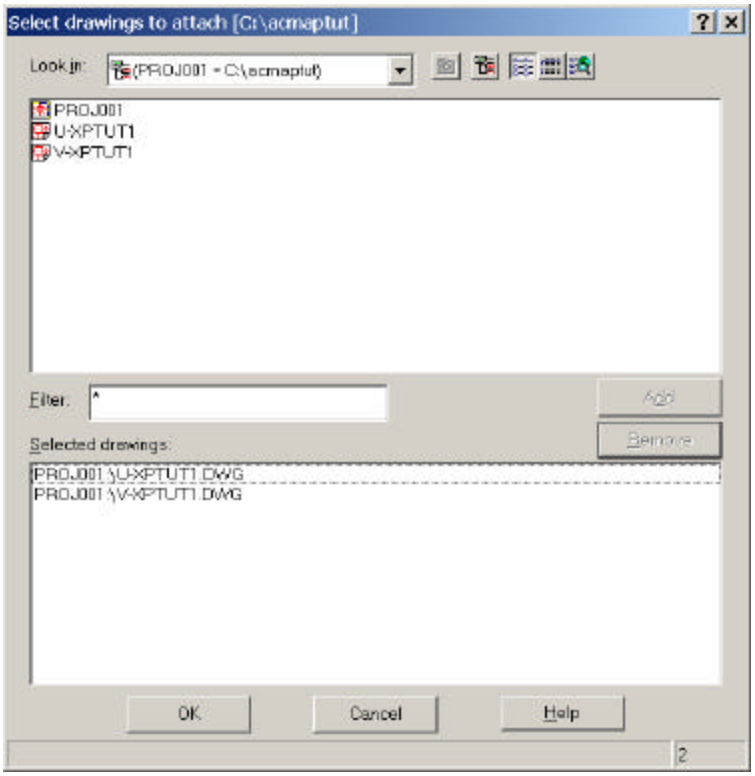
3. Enter proj001 for the Drive Alias and C:/acmaptut for the Actual Path, choose Add then Close.



4. Choose proj001 from the Look in list.



5. Highlight U-XPTUT1 and V-XPTUT1, choose Add, then choose OK.

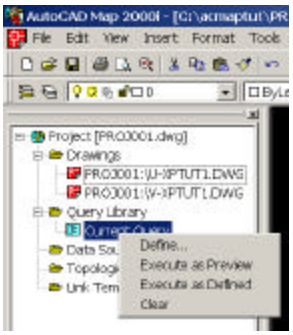


To query mapping

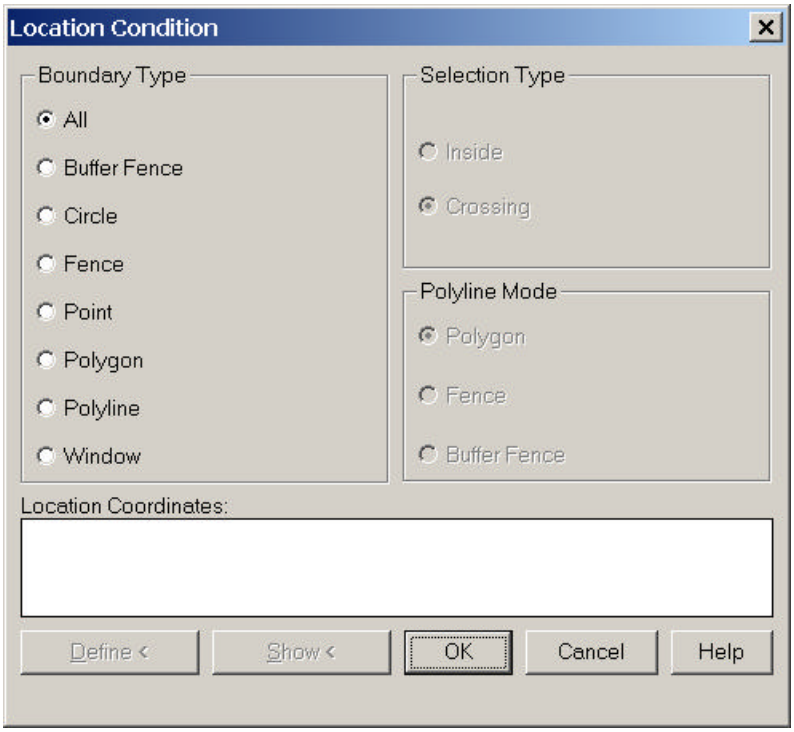
1. Right-click on V-XPTUT1.DWG and choose Zoom Extents.

2. Right-click on Current Query under Query Library in the Project Workspace.

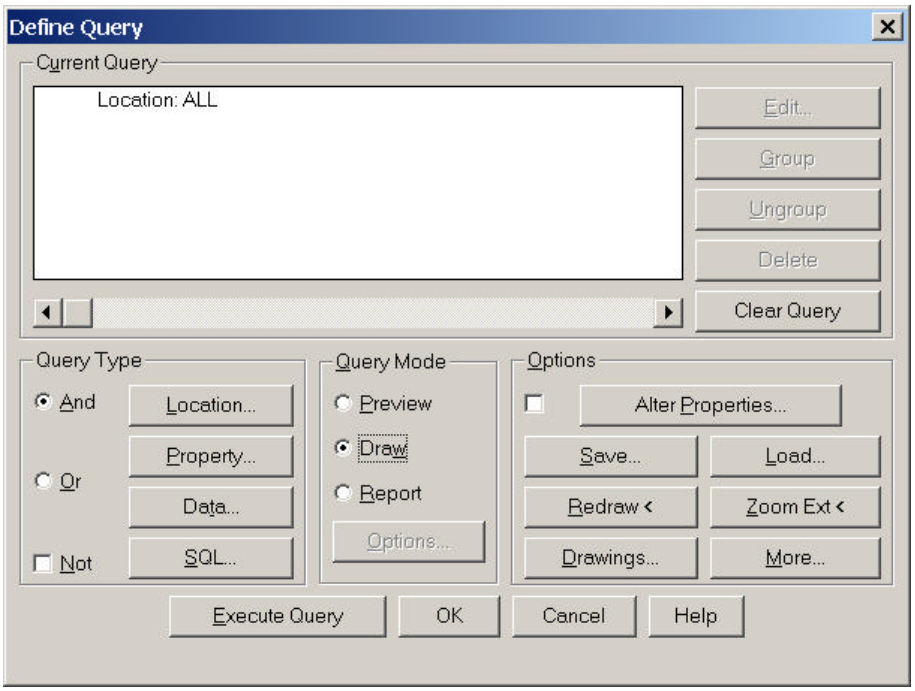
3. From the menu choose Define.



4. Choose Location, choose All, choose OK.

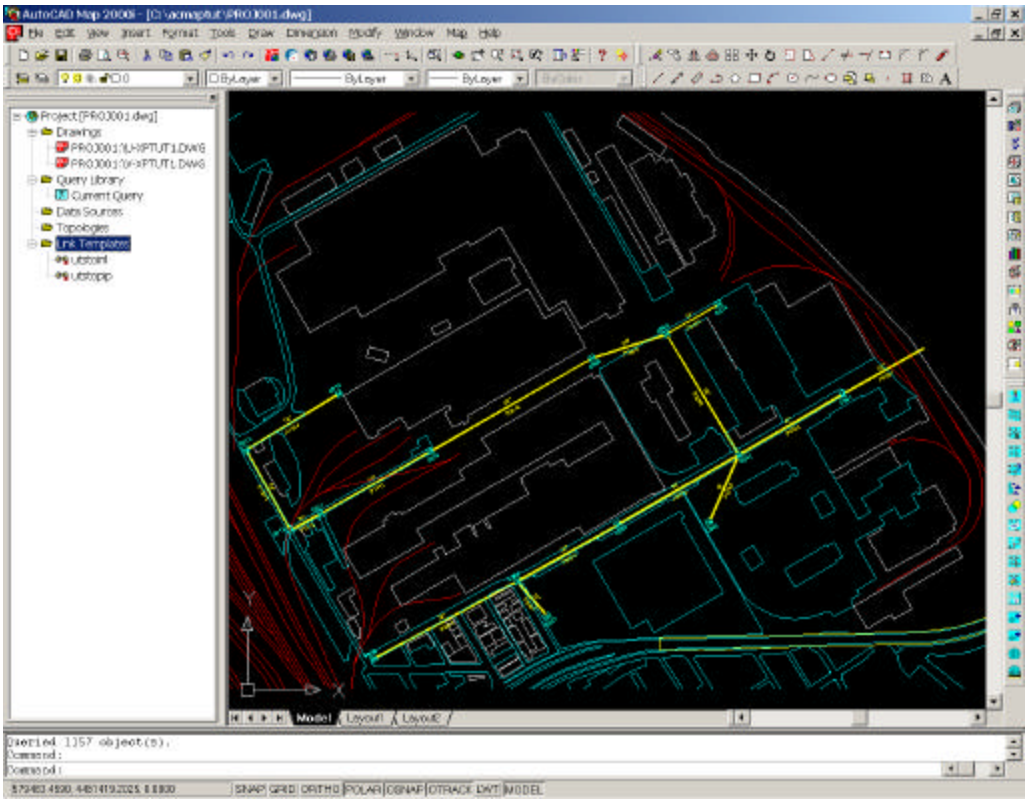


5. Under Query Mode Choose Draw



6. Choose Execute Query.

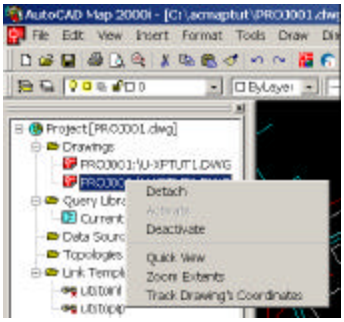
7. The drawing should look like this.



To alter properties when querying objects

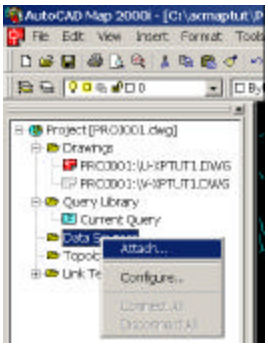
1. Right-click on U-VPTUT1.DWG under Drawings in the Project Workspace.

2. From the menu choose Deactivate.

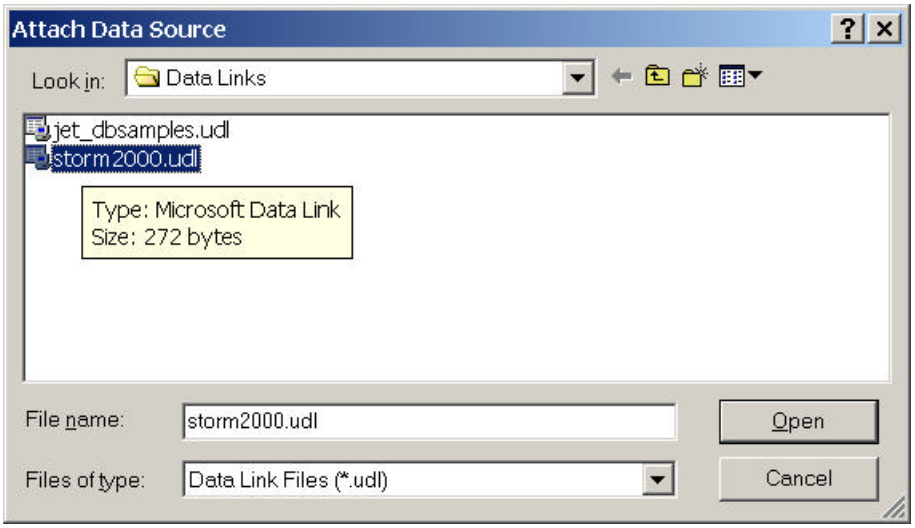


3. Right-click on Data Sources in the Project Workspace.

4. Choose Attach.

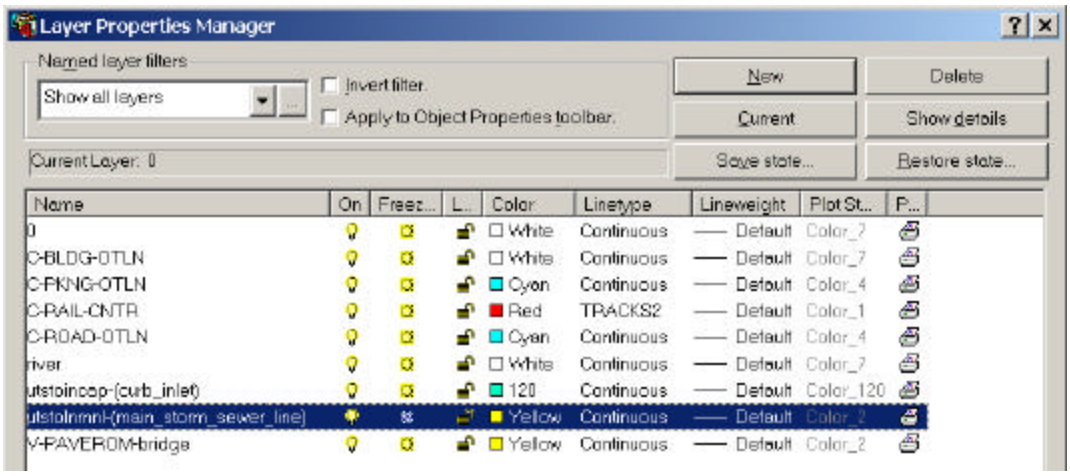


5. Choose Storm2000.udl, Then choose OK.



6. From the Format menu choose Layer.

7. Freeze the piping layer, then choose OK.

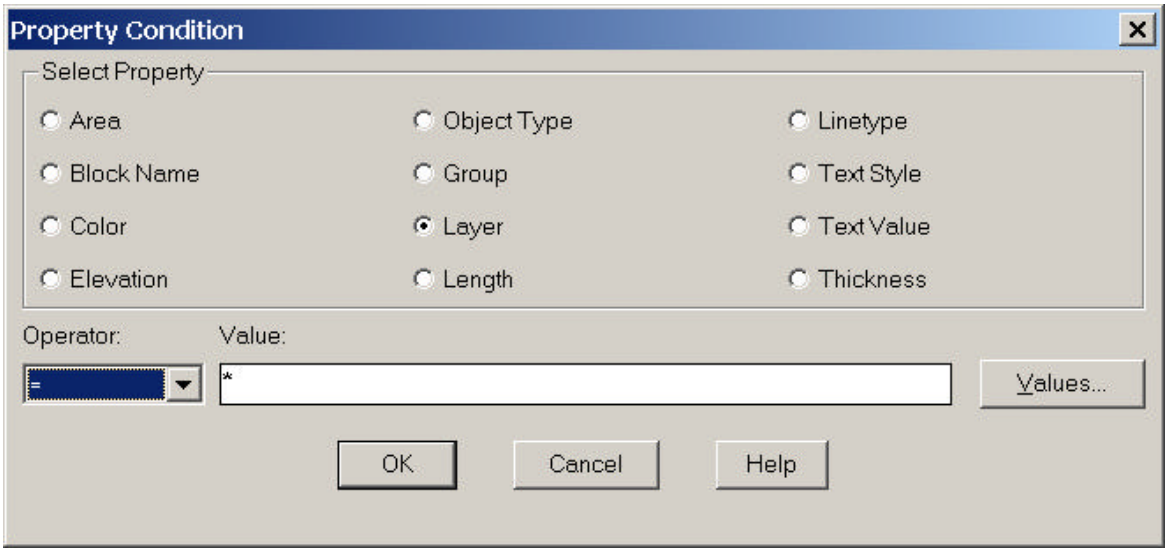


8. Right-click on Current Query under Query Library in the Project Workspace.

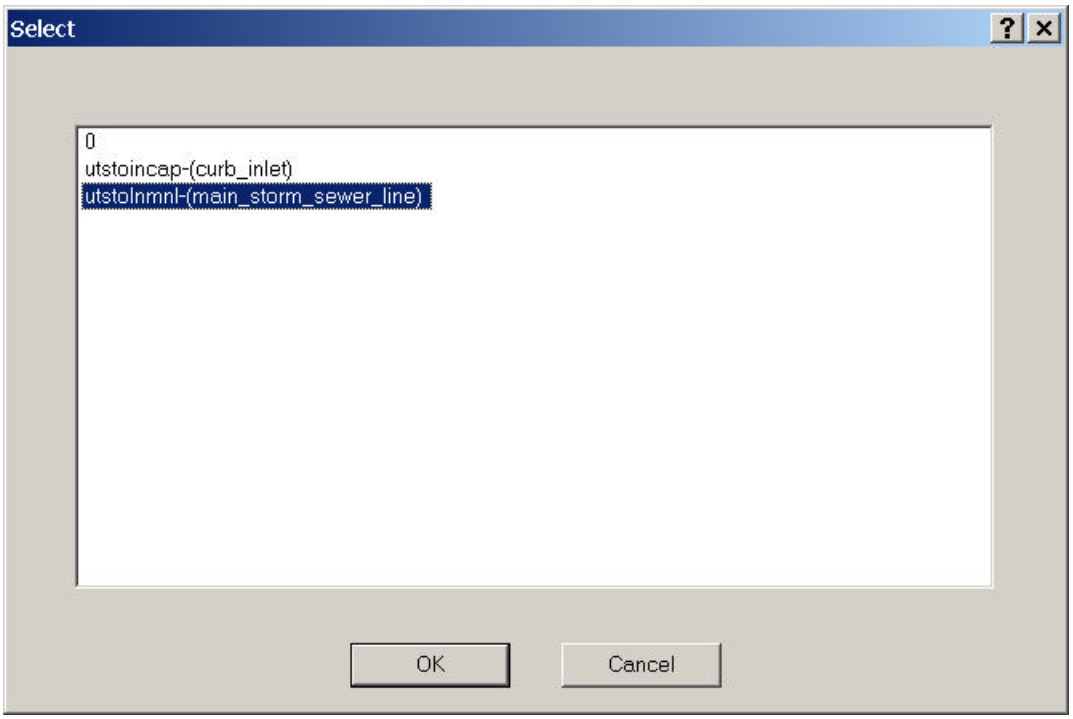
9. From the menu choose Define.

10. Choose Clear Query, then choose Property.

11. Choose Layer, then choose Values.

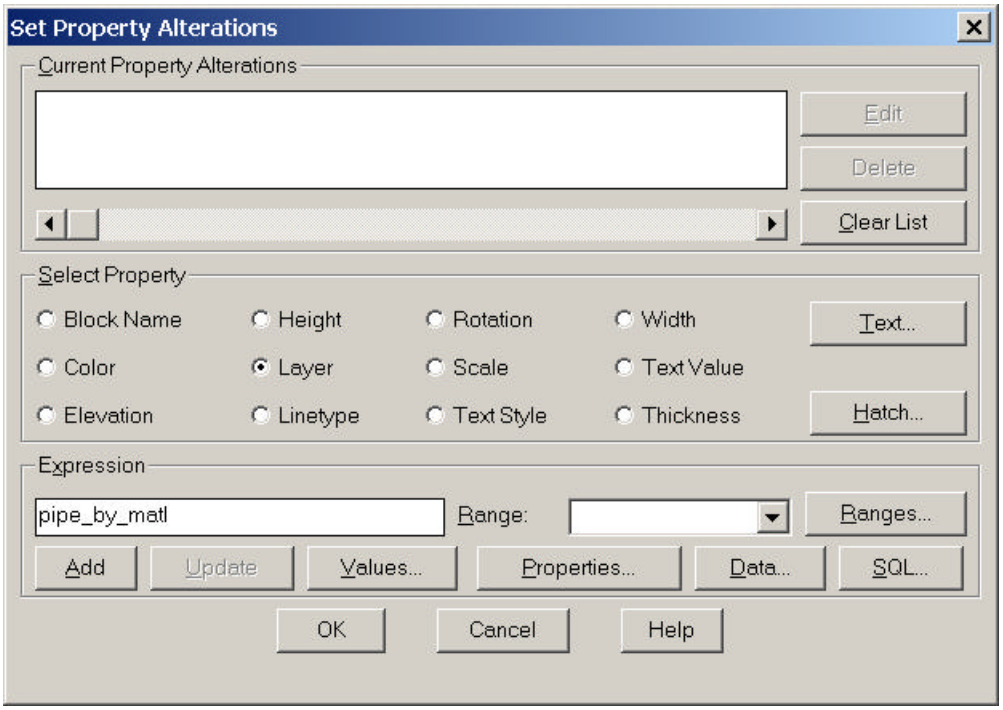


12. Choose the main sewer line layer, choose OK, then choose OK.

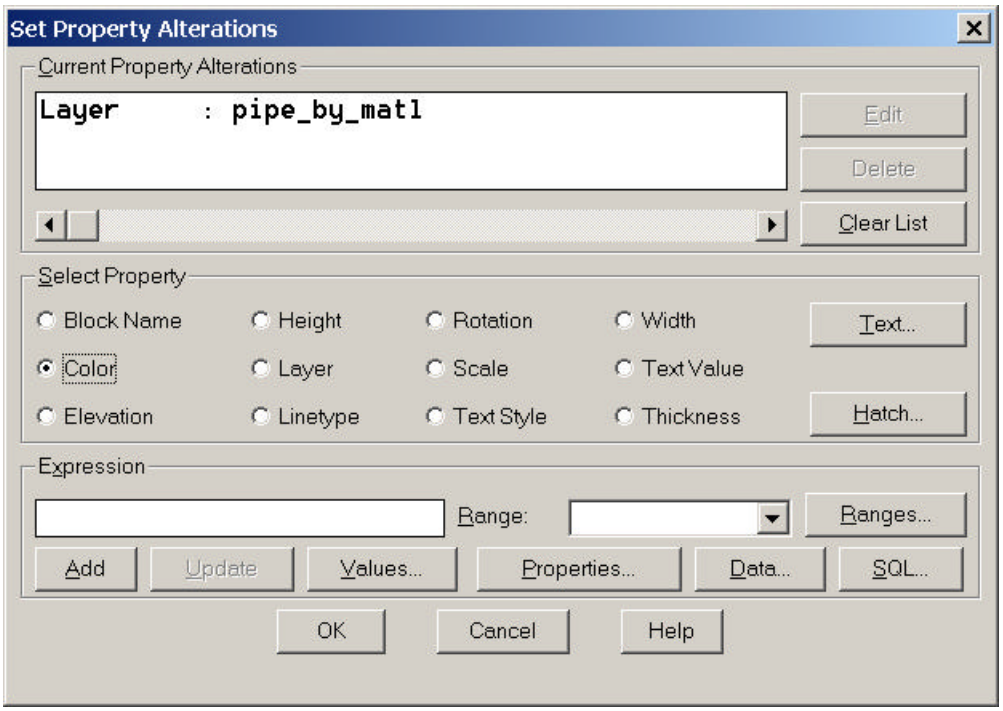


13. Under Options, check the box next to Alter Properties, then choose Alter Properties.

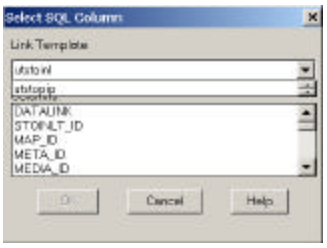
14. Under Select Property choose Layer, enter pipe_by_matl in the Expression Box, then choose Add.

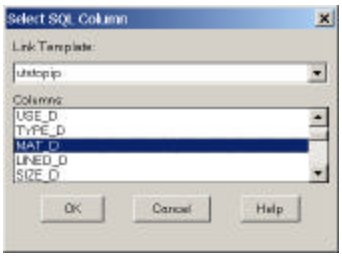


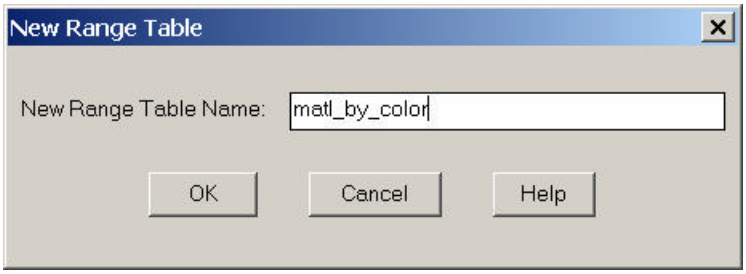
15. Under Select Property choose Color, then choose SQL.



16. Choose utstopip from the Link Table list, choose MAT_D, then choose OK.

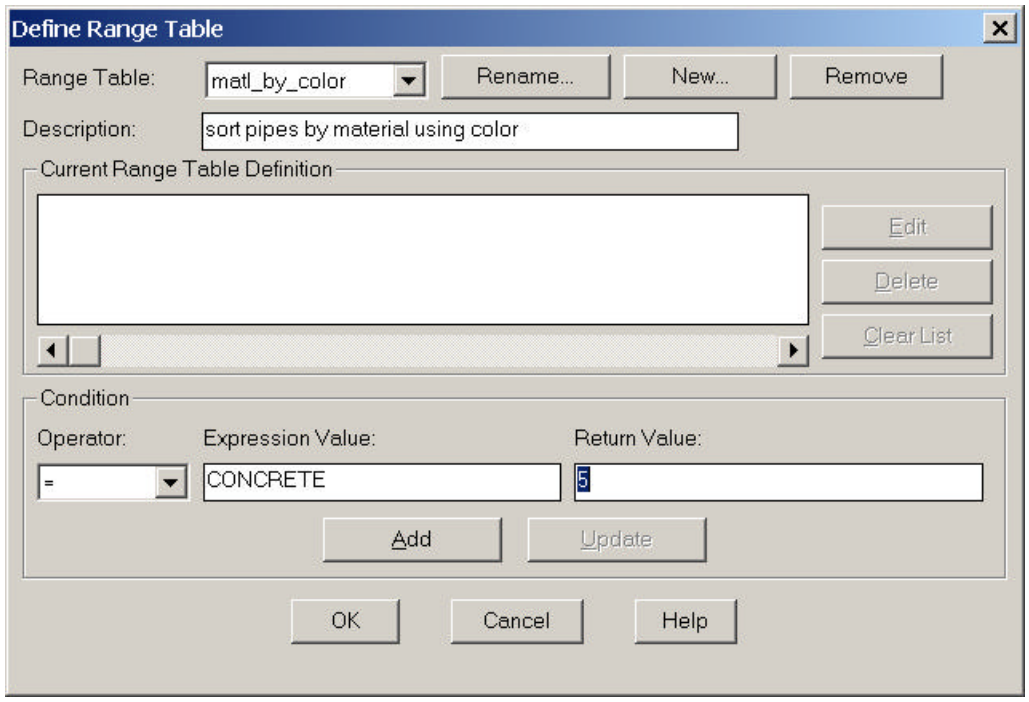




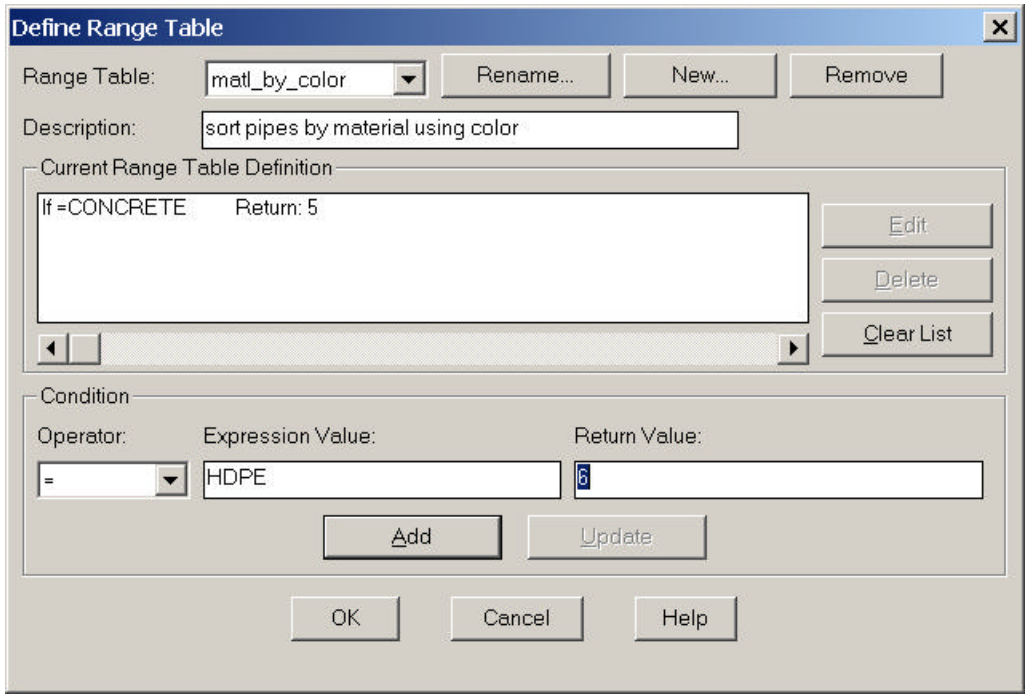


17. Choose Ranges, choose New, then enter matl_by_color for the Range Table Name.

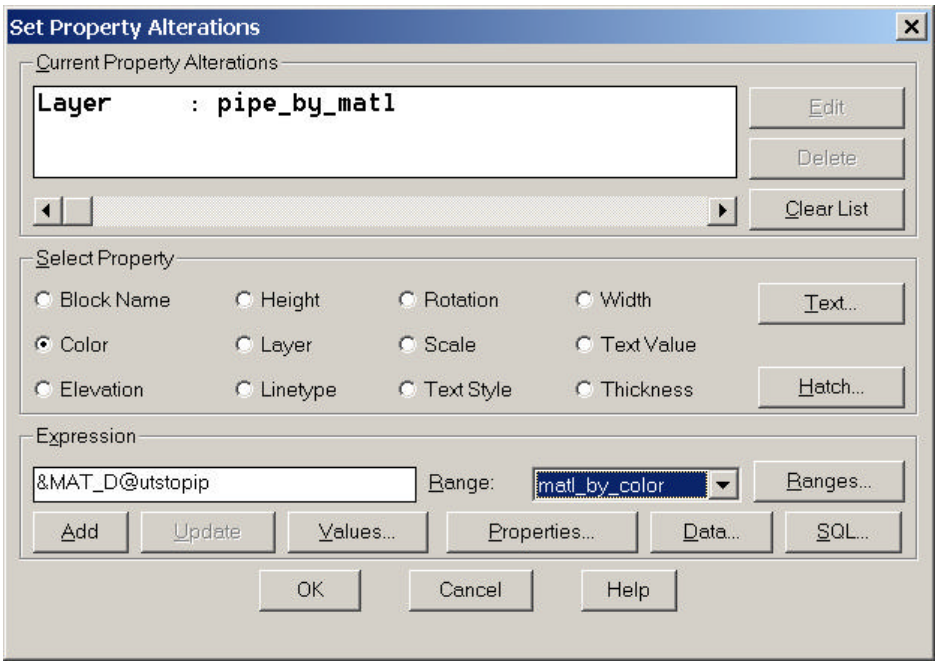
18. Under Condition enter CONCRETE in the Expression Value and 5 in the Return Value. Choose Add.



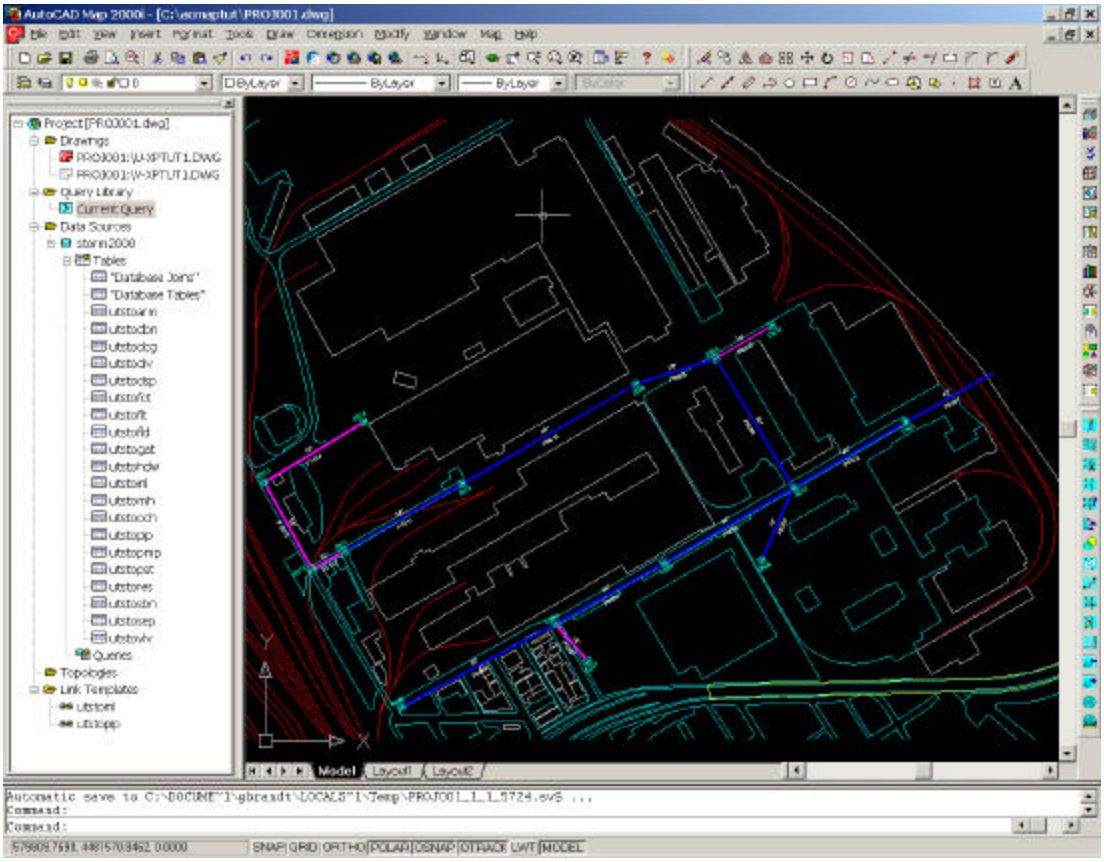
19. Enter HDPE in the Expression Value and 6 in the Return Value. Choose Add, Then OK.



20. From the Range list choose matl_by_color, choose Add, then choose OK.



21. Choose Execute Query.



Issues with Oracle

There are a few additional steps required to use Oracle as a data source.

Using the SQL Generator

To configure the SQL Generator

1. From the Windows Start Menu choose SQL Generator.

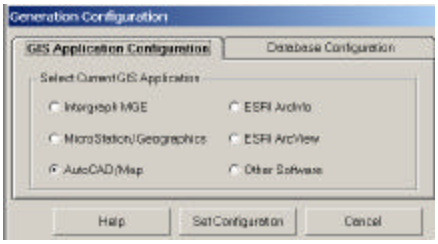
2. From the Configure menu choose Connect.

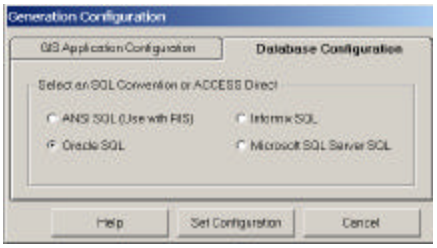
3. Verify and /or change the location of the data connection files and choose Connect, Test and Save.

4. From the Configure menu choose Configuration.

5. Under GIS Application Configuration choose AutoCAD/Map.

6. Under Database Configuration choose Oracle SQL.

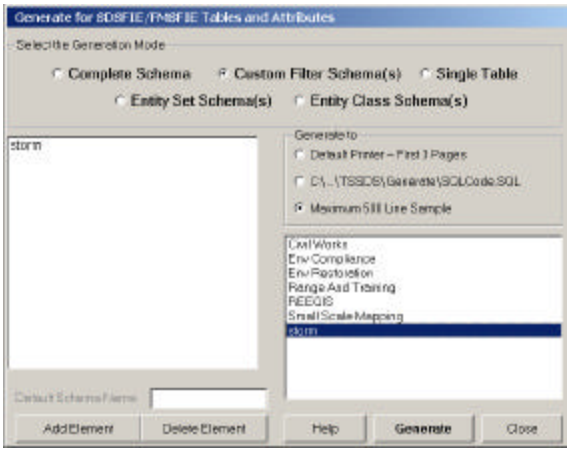




To generate tables and attributes

1. From the Generate menu choose New, then Table and Attributes.

2. For the Generation Mode choose Custom Filter Schema, then double-click storm custom filter.



3. For Generate to choose C:\…\TSSDS\Generate\SQLCode.SQL to save your code to a file.

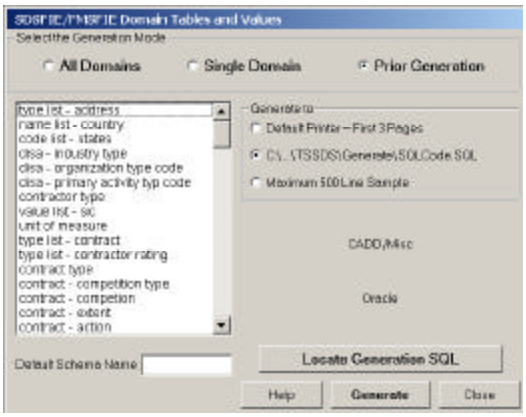
4. Choose Generate then Close.

5. From the Windows Start Menu choose Windows Explorer. Navigate to the directory containing SQLCode.SQL and rename the file to storm_table_att.SQL.

To generate domains and values

1. From the Generate menu choose New, then Domains and Values.

2. For the Generation Mode choose Prior Generation.



3. For Generate to choose C:\…\TSSDS\Generate\SQLCode.SQL to save your code to a file.

4. Choose Locate Generation SQL, choose the file storm_Table_Att.SQL, then choose OK.

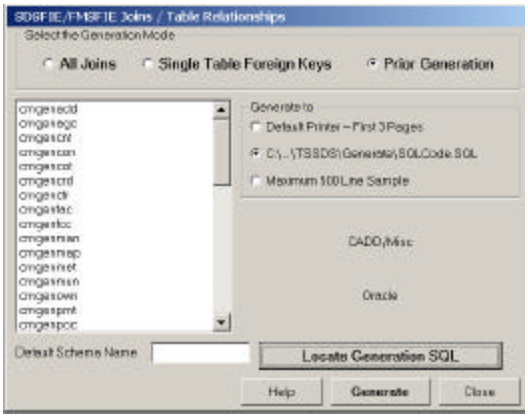
5. Choose Generate, then Close.

6. In Windows Explorer rename SQLCode.SQL to storm_Domain_Val.SQL.

To generate join/table relationships

1. From the Generate menu choose New, then Domains and Values.

2. For the Generation Mode choose Prior Generation.



3. For Generate to choose C:\…\TSSDS\Generate\SQLCode.SQL to save your code to a file.

4. Choose Locate Generation SQL, choose the file storm_Table_Att.SQL, then choose OK.

5. Choose Generate, then Close.

6. In Windows Explorer rename SQLCode.SQL to storm_Join_table.SQL.

Compiling SQL Code in Oracle

To create a user

Due to the complexity of Oracle the task of assigning usernames is usually assigned to a qualified Oracle Database Administrator. This tutorial uses the username mapuser with the password acadmap.

Using SQL+ Worksheet

SQL+ Worksheet is a utility supplied with Oracle that aids in loading and compiling SQL. Have a DBA run the 3 SQL files created from the SQL Generator in SQL+ Worksheet to create an empty database structure.

To populate the database

Once again the task of importing the 2 text files into a newly created data structure should be preformed by a DBA.

Configuring an Oracle Database in Map

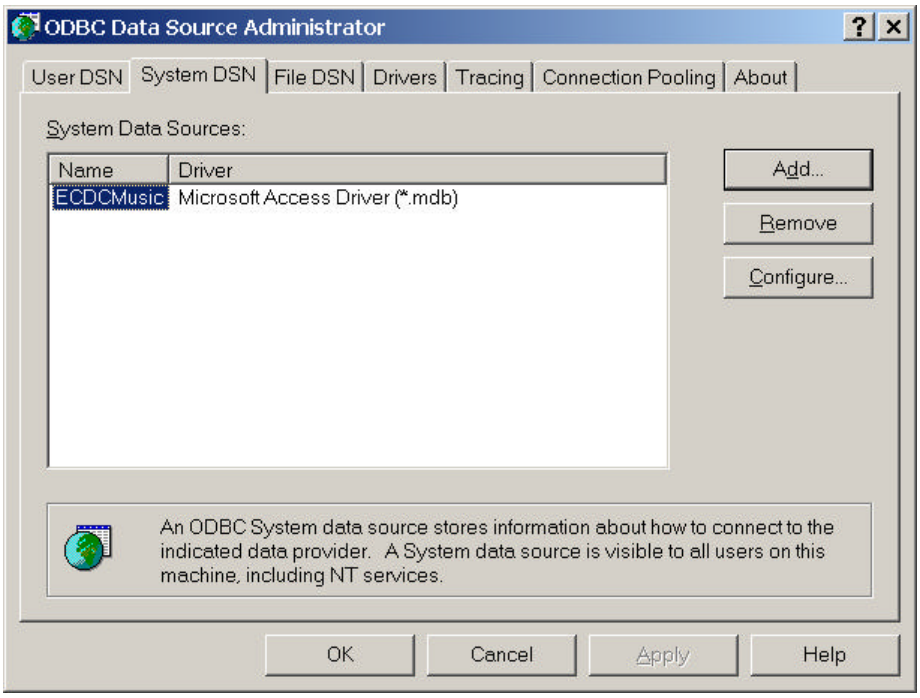
Configuring an external Oracle database for use with AutoCAD Map requires the use of the Oracle Provider driver. This driver is loaded during the initial installation of Map. Unlike Access, the process for using Oracle as your data source is not as automatic. The user will have to manually create a DSN and UDL file.

To set up an ODBC

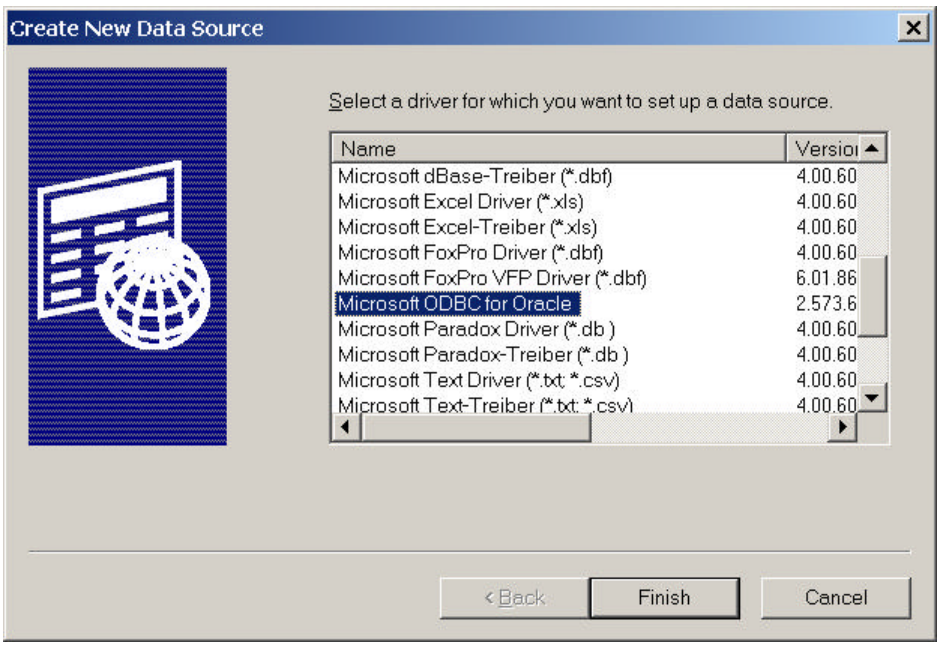
1. From the Windows Start Menu choose Settings, then Control Panel.

2. In the Administrative Tools folder double-click on Data Sources (ODBC).

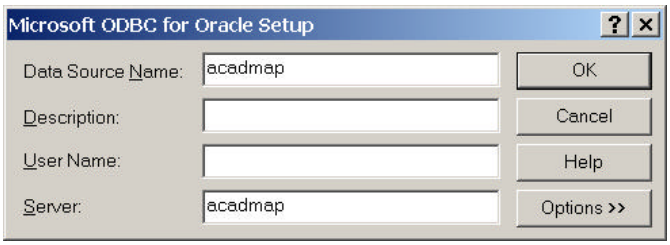
3. Under the System DSN tab choose Add.



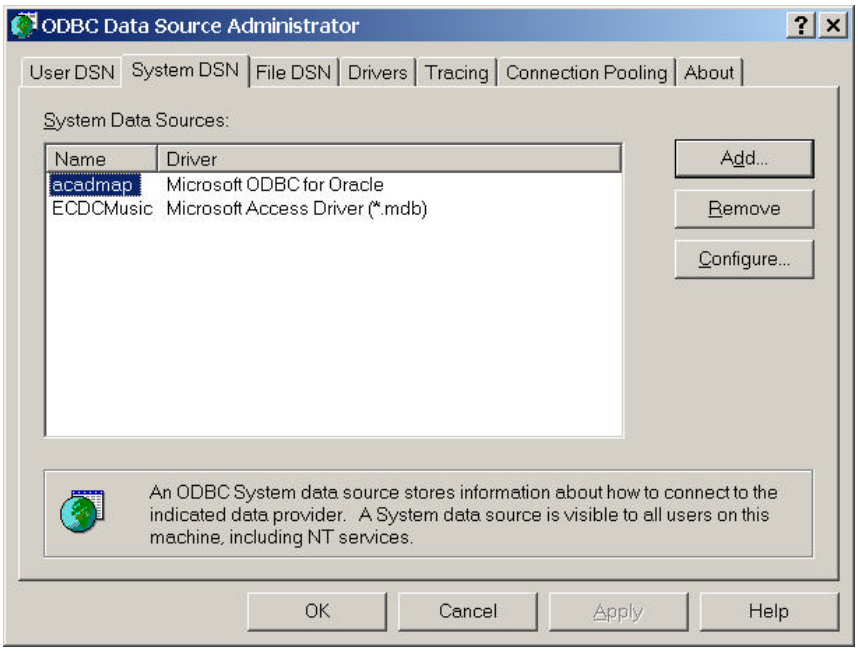
4. Choose Microsoft ODBC for Oracle from the driver list, then choose Finish.



5. Enter a Data Source Name (DSN) and the Server Name (supplied by DBA). This tutorial uses acadmap for the DSN and acadmap for the Server.



6. Choose OK then OK.

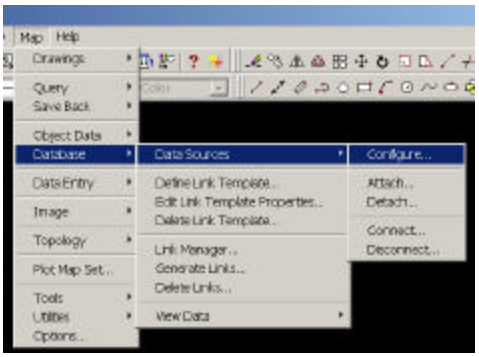


Configuring a Data Source in AutoCAD Map

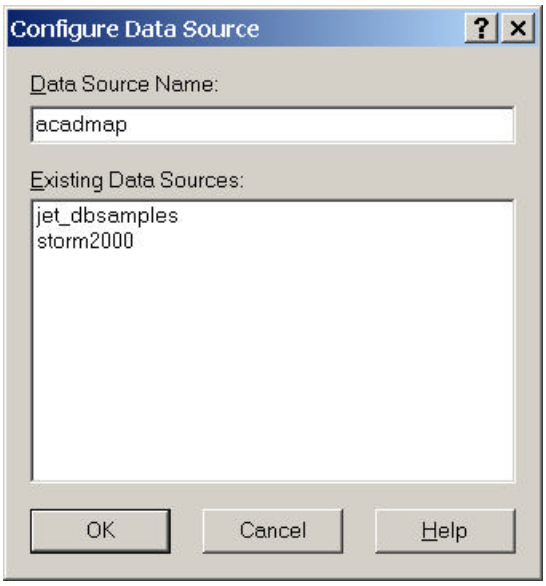
Open a new drawing in Map for this next step.

To manually configure a data source

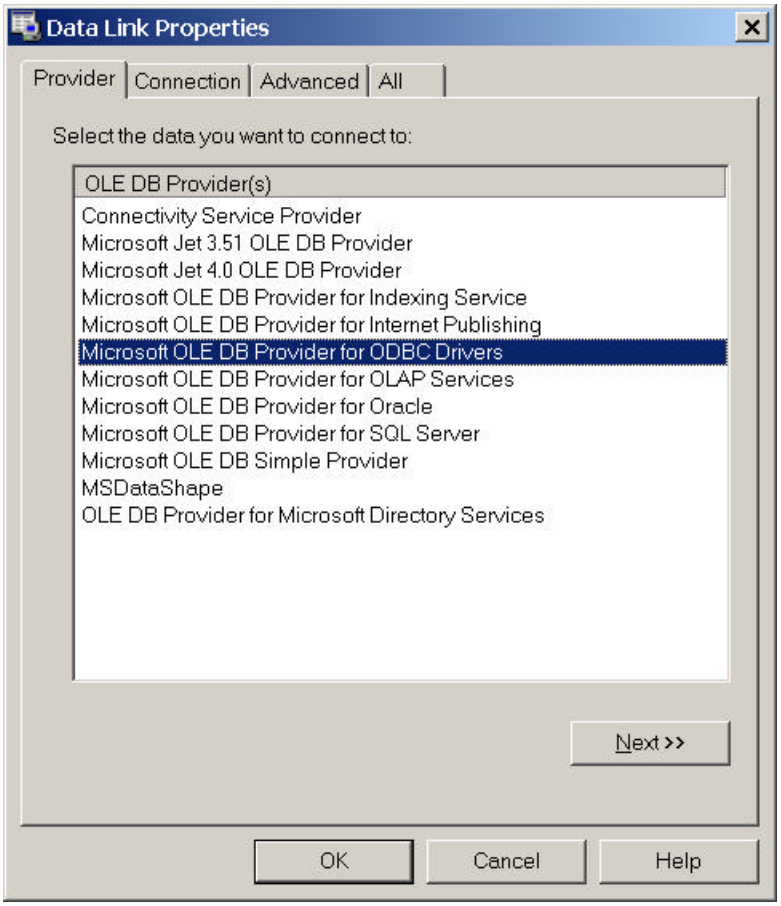
1. From the Map menu choose Database> Data Sources> Configure.



2. Enter acadmap as the DSN and choose OK.

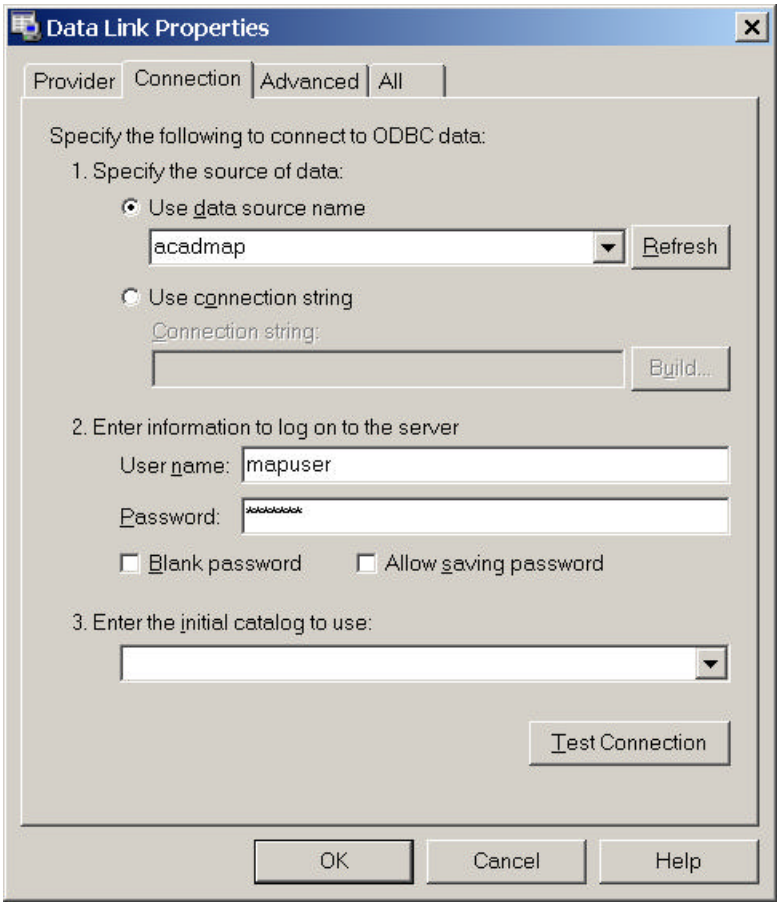


3. Under the Provider tab choose Microsoft OLE DB Provider for ODBC Drivers, then choose Next.



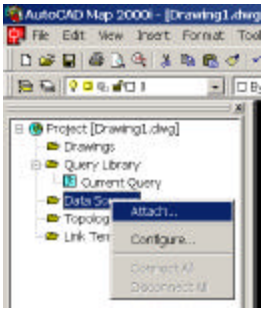
4. Under the connection tab choose acadmap from the DSN list, then enter the username and password (mapuser and acadmap in this case).

5. Choose Test Connection to verify connection to the database, then choose OK.

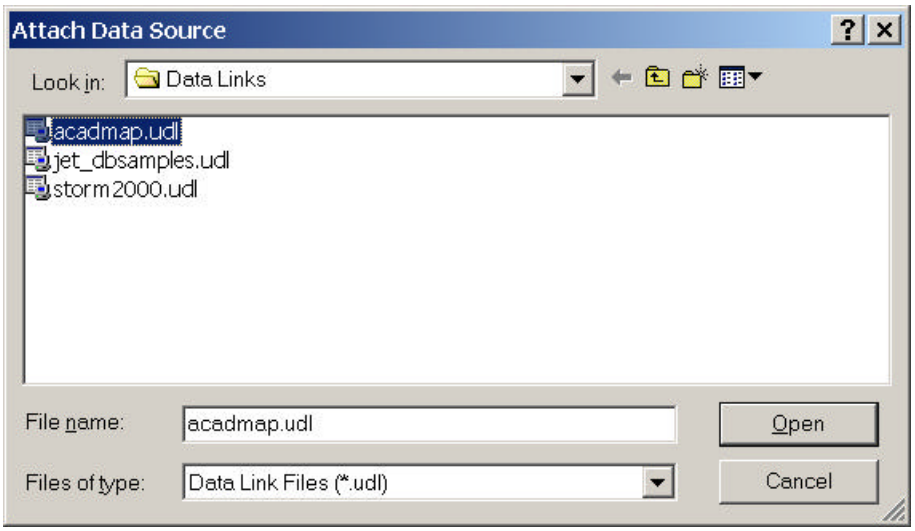


To attach a data source

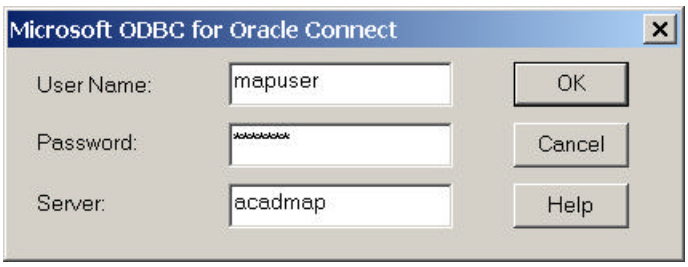
1. Right-click on Data Sources in the Project Workspace. Choose Attach.



2. Choose acadmap.udl, then choose Open



3. Enter the username, password (acadmap, in this case) and server, then choose OK.



Using data view to view data

1. Double-click on table mapuser.utstopip from the acadmap data source.

3 Bibliography

1. Autodesk, Inc., “AutoCAD Map 2000I Concepts”, Release 4.5.

2. Groff, James R. and Weinberg, Paul N.; “Using SQL”; Osborne McGraw-Hill, 1990.

3. CADD/GIS Technology Center, “A/E/C CADD Standard Technical Report”, October 1999.

4. CADD/GIS Technology Center, “Implementing the SDSFIE and FMSFIE using ESRI’s ArcView Version 3.2 Technical Paper”, November 1999.

5. CADD/GIS Technology Center, Online help files from the following programs:
   - SDS FMS Browser, Version 2.0
   - SQL Generator, Version 2.0
   - Access Builder, Version 2.0
   - Access Data Creator, Version 2.0
   - Filter Maker, Version 2.0
   - Filter Eraser, Version 2.0

6. Autodesk, Inc., Online help files from AutoCAD Map 2000i, Release 4.5

7. Carol McCullough-Dieter; “Oracle8i for Dummies”; IDG Books Worldwide, Inc., 1990.