



CUAHSI
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HOW TO DOWNLOAD AND USE THE OBSERVATIONS DATA MODEL

Specification

Download and use the ODM databases with ODMTools, MS Access, MS Excel, SQL Server 2005 and ArcGIS

January 7, 2010

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Distribution

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Funding

Funding for this document was provided by the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) and the Texas Commission on Environmental Quality (TCEQ).

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1 INTRODUCTION

This document illustrates a step by step approach on how to download an ODM database and use the database in MS Access, MS Excel, SQL Server 2005 and Arc GIS. My goals in creating this document are:

1. To outline a procedure for downloading the ODM databases from CUAHSI websites.
2. To install SQL Server 2005 application.
3. Walkthrough: Downloading data from EFIS website into SQL Server 2005, MS Excel, MS Access and ArcGIS.
4. Troubleshooting

2 INSTALLATION INFORMATION

2.1 INSTALLATION PREREQUISITES

2.1.1 SOFTWARE PREREQUISITES

Prior to using the ODM Databases and downloading them, you should have the following software installed:

- **SQL Server 2005** Express Edition and **SQL Server Management Studio Express** (Instructions on how to install the software has been documented in section 3.1.1)
- **Microsoft Office Excel 2007** (You can find more information about this application at <http://office.microsoft.com/en-us/excel/default.aspx>)
- **Microsoft Office Access 2007** (You can find more information about this application at <http://office.microsoft.com/en-us/access/default.aspx>)
- **ODM Tools** is an application created to allow administrators and users of ODM to visualize, manage, manipulate, edit, and export data that have been imported to their local instance of the ODM (You can find more information about this application at <http://his.cuahsi.org/odmtools.html>).
- **ArcGIS** is an integrated collection of GIS software products that provides a standards-based platform for spatial analysis, data management and mapping (You can find more information about this application at <http://www.esri.com/software/arcgis/>).

2.2 INSTALLING THE SQL SERVER 2005 AND SQL SERVER MANAGEMENT STUDIO EXPRESS

1. Identify the **system requirements**. SQL Server 2005 Express Edition does not have significant system overhead requirements, particularly given the overpowered nature of many of today's newest servers. The minimum requirements recommended are 512 MB of RAM, a drive space of 600 MB, 600 MHz processor and .NET Framework 2.0 and MSXML 6. Most computers do have these requirements already met.

2. I mentioned above that there are a number of prerequisites for SQL Server 2005 Express Edition. You need to take the necessary steps to get these prerequisite items installed.
3. **Install the prerequisites and SQL Server 2005**
 - a. **Download Microsoft .NET framework** from <http://www.microsoft.com/downloads/details.aspx?FamilyID=0856eacb-4362-4b0d-8edd-aab15c5e04f5&DisplayLang=en> . After downloading execute the *dotnetfx.exe* and follow the instructions to complete the installation.
 - b. **Download MSXML6** from <http://www.microsoft.com/downloads/details.aspx?familyid=993C0BCF-3BCF-4009-BE21-27E85E1857B1&displaylang=en> and execute *msxml6.msi*. This is a quick installation.
 - c. **Install SQL Server 2005 Express Edition.** You can follow the steps on the home page (<http://www.microsoft.com/Sqlserver/2005/en/us/express.aspx>) for installation of SQL Server 2005.
 - d. At this point, SQL Server 2005 Express Edition is installed and can be managed using the **SQL Server Management Studio Express** tool that was installed along with the database server. To access this tool go to Start | All Programs | Microsoft SQL Server 2005 | SQL Server Management Studio Express.

2.3 INSTALLING MS EXCEL AND MS ACCESS

MS Excel and MS Access are default Microsoft Office applications that are available to you once you have Microsoft Office 2007 applications installed on your desktop. In case you don't happen to have Microsoft applications already installed, you can get it from the Microsoft home page <http://office.microsoft.com/en-us/suites/fx101674091033.aspx>

2.4 INSTALLING ARC GIS

It is assumed that almost all the users have ArcGIS software installed on their desktops. In case you are new to ArcGIS, please visit the link to the ESRI home page <http://www.esri.com/software/arcgis/extensions/districting/download.html> for further details.

2.5 INSTALLING ODM TOOLS

The ODM Tools application was created to allow administrators and users of ODM to visualize, manage, manipulate, edit, and export data that have been imported to their local instance of the ODM. To install the ODM Tools you can follow the steps below:

1. Visit the CUAHSI HIS website for ODM Tools <http://his.cuahsi.org/odmtools.html>

Figure 1: Home Page for ODM Tools on CUAHSI HIS

The screenshot shows the Mozilla Firefox browser window titled "CUAHSI Hydrologic Information System - ODM Tools". The address bar shows the URL <http://his.cuahsi.org/odmtools.html>. The page header includes the CUAHSI HIS logo with the tagline "Sharing hydrologic data" and a Google Custom Search box.

The main content area is titled "ODM Tools" and contains the following text:

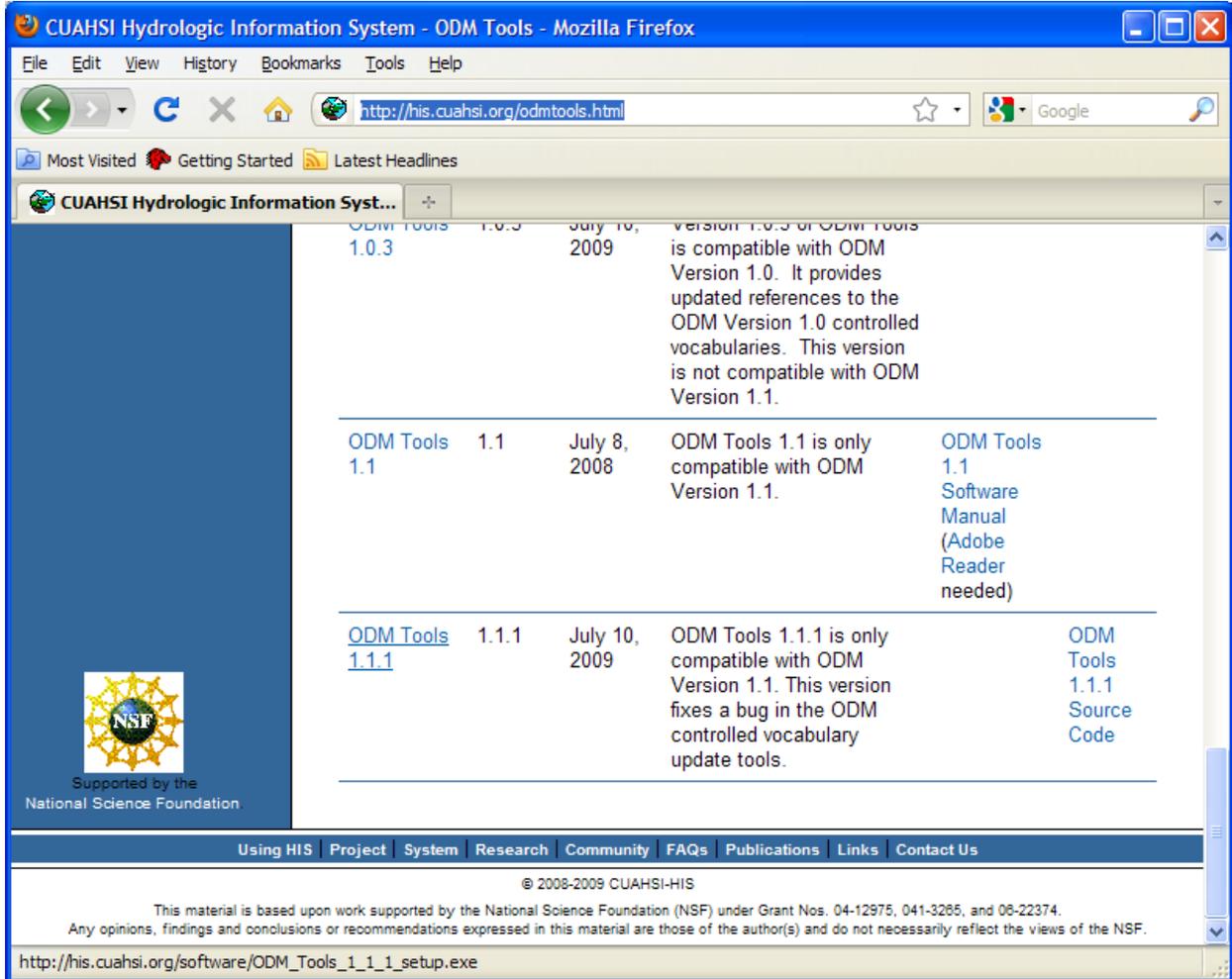
The ODM Tools application was created to allow administrators and users of ODM to visualize, manage, manipulate, edit, and export data that have been imported to their local instance of the ODM. The ODM Tools application is organized into three general areas: 1) query and export; 2) visualize; and 3) edit. The Query and export functionality allows users to find the data that they are interested in and export it to a simple format that can be used with a variety of analysis software. The Visualize functionality allows users to quickly plot and summarize data using a variety of plot types and descriptive statistics. The Edit capability of ODM Tools was

On the right side of the page, there is a data visualization window titled "ODM Tools" showing a hydrograph for station "WWS10210400 - EAST Fk BEAR RIVER NR EVANSTON, WYOMING". The graph plots "WATER FLOW (CFS)" on the y-axis (0 to 1200) against "Date" on the x-axis (1970 to 2011). The graph shows a series of peaks, with the highest peak reaching approximately 1100 CFS around 1980. To the right of the graph is a table of statistics:

Statistic	Value
Station	WWS10210400
Station Name	EAST Fk BEAR RIVER NR EVANSTON, WYOMING
Station Type	Flow
Station Unit	CFS
Station Description	Flow
Station Agency	USGS
Station Code	10210400
Station Date	1/1/1970
Station Time	12:00:00
Station Interval	15
Station Frequency	15
Station Resolution	15
Station Accuracy	15
Station Precision	15
Station Tolerance	15
Station Error	15
Station Bias	15
Station Drift	15
Station Offset	15
Station Scale	15
Station Shift	15
Station Slope	15
Station Y-intercept	15
Station R-squared	15
Station P-value	15
Station F-statistic	15
Station T-statistic	15
Station Z-statistic	15
Station Chi-squared	15
Station Lambda	15
Station Mu	15
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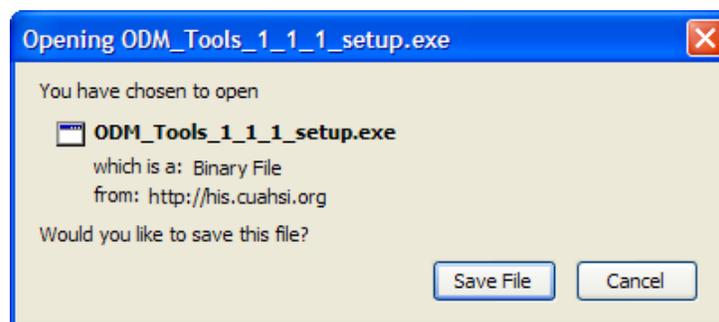
2. Scroll to the bottom of the page and you will find the link to Download ODM Tools 1.1.1.

Figure 2: Link to the ODM Tools 1.1.1



3. Click on the ODM Tools 1.1.1 to save the installer file for ODM Tools.

Figure 3: The executable file for Installing ODM Tools



Please use the [ODM Tools Design Specifications Document](#) for further information about installing the ODM Tools and how to use these Tools. The ODM Tools software protects the security and consistency of a work group HIS ODM database because it provides users with a set of automated tools for performing many of the most common database transactions. Second, ODM Tools allows users to export data from their ODM instance with an accompanying metadata file. This allows users to work with local copies of data series exported from their ODM database while preserving the provenance of the data via the metadata file. ODM Tools also provides a mechanism by which users can interact with the ODM database without having to learn the complexities of its relational structure. Last, for more advanced users, the source code of the ODM Tools application provides an example of how applications can be built on top of the CUAHSI HIS ODM.

3 WALKTHROUGH: DOWNLOADING THE OBSERVATIONS DATA MODEL FROM EFIS HOME PAGE

This section illustrates how to download ODM Databases. After completing this walkthrough you should be able to download the SQL Server ODM database files from the Environmental Flows Information System for Texas (EFIS) website. We will begin looking at the EFIS Online map interface.

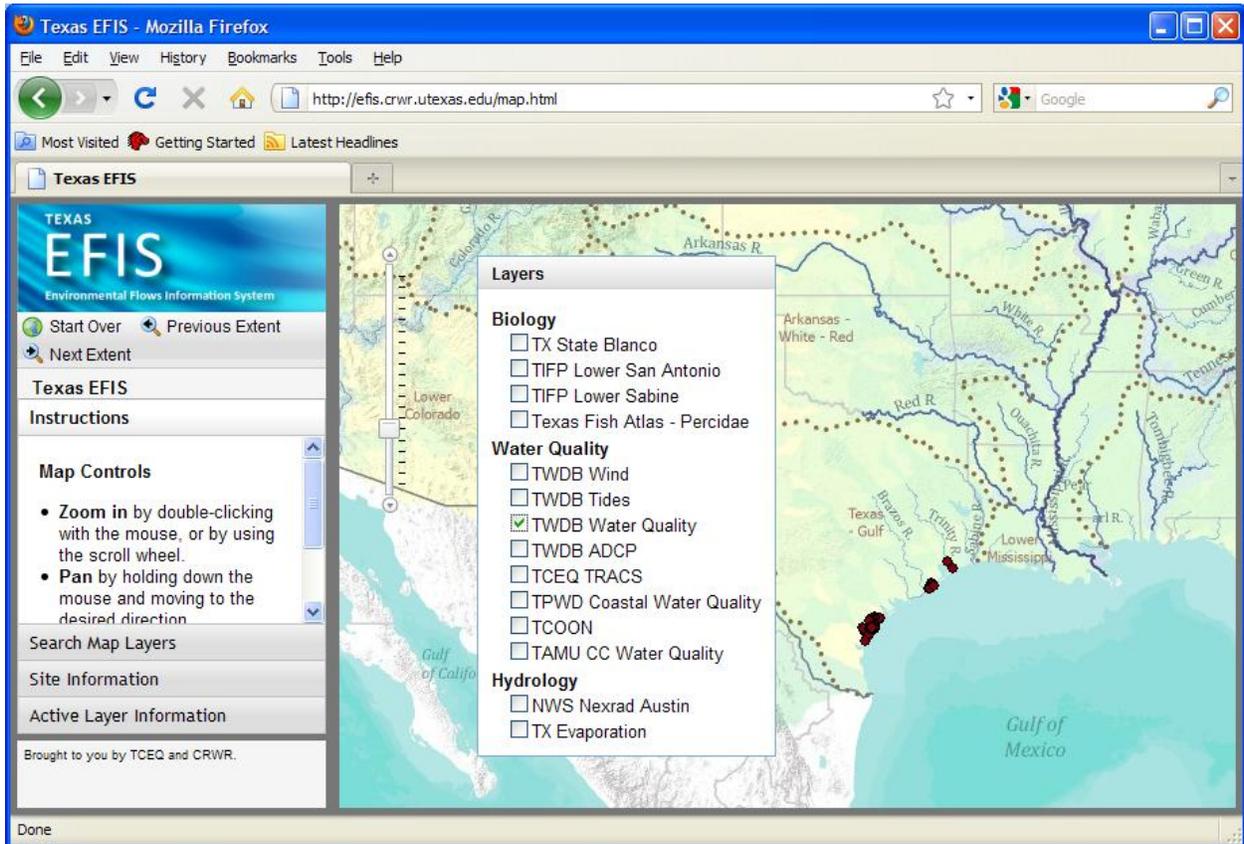
Numerous ODM databases can be downloaded from the Interactive Map Viewer on the EFIS website: <http://efis.cwrw.utexas.edu>.

1. Navigate to the home page for EFIS <http://efis.cwrw.utexas.edu>

Figure 4: The home page of EFIS

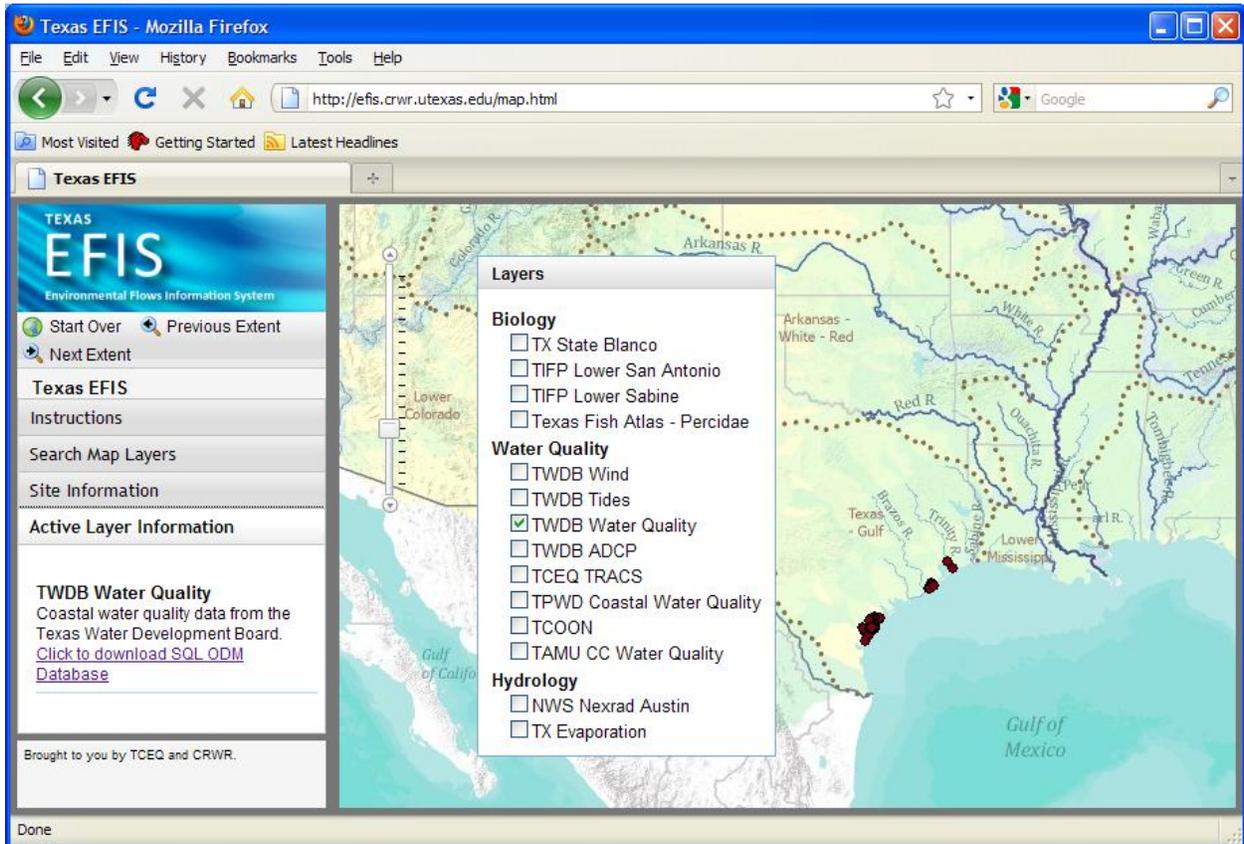


Figure 6 : Map display showing sites information for TWDB Water Quality



5. In order to download the SQL Server 2005 database for the TWDB Water Quality sampling points, **Click on the Tab Active Layer Information** at the bottom left hand-side of web page. The tab slides upward and you will see the link to download the SQL database which says **“Click to download SQL ODM Database”**

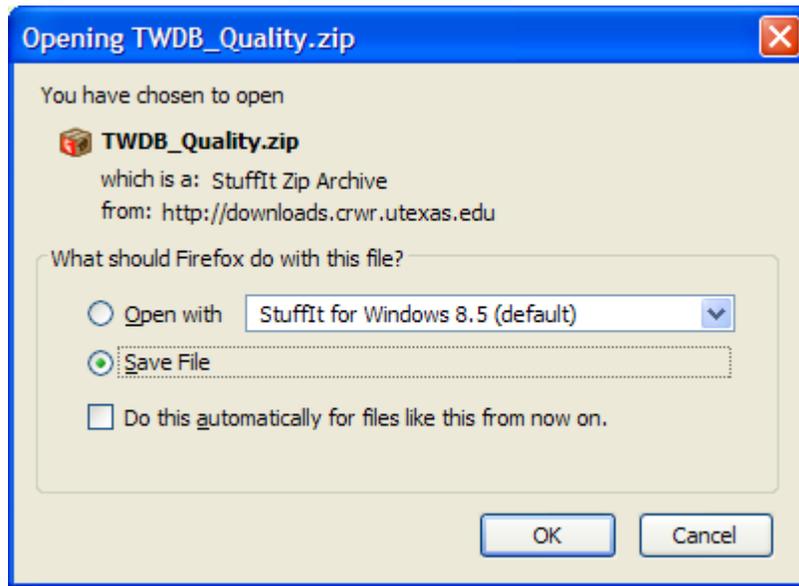
Figure 7 : Click on Active Layer Information tab to find link to the database



You can see highlighted text **“Click to download SQL ODM Database”**. This contains the link to a zipped version of the TWDB_Quality ODM database and is available for download from CRWR.

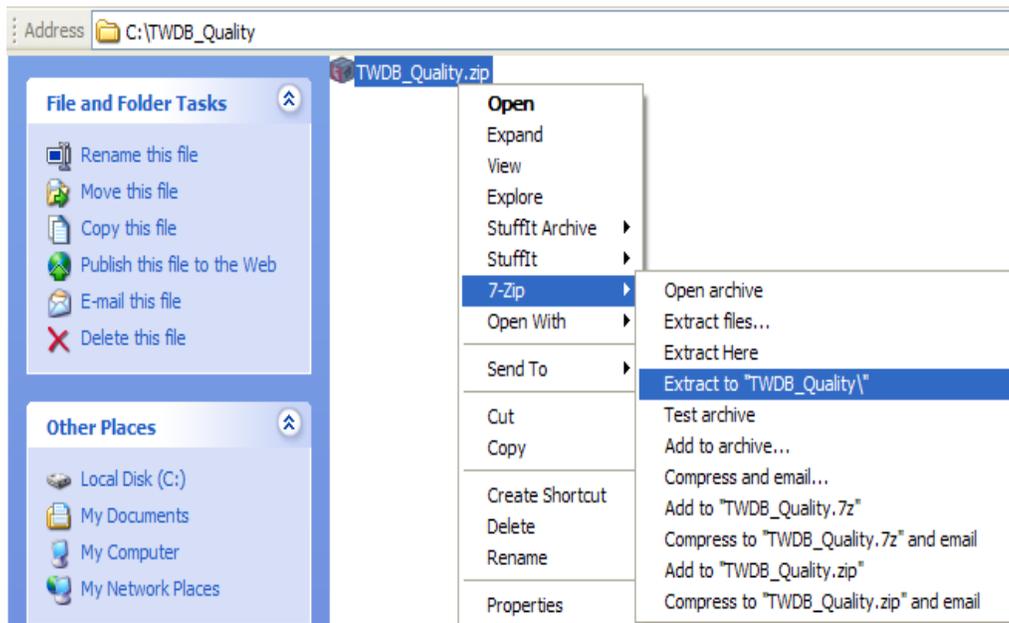
6. On clicking the link to the ODM database a pop up window will appear on your screen and will ask for your preferences if you want to open the file with an application that is loaded on your local machine or if you want to save the file. The **best option would be to save the file** to a local folder where you would like your database to be located.

Figure 8 : Dialog to download and save the ODM database



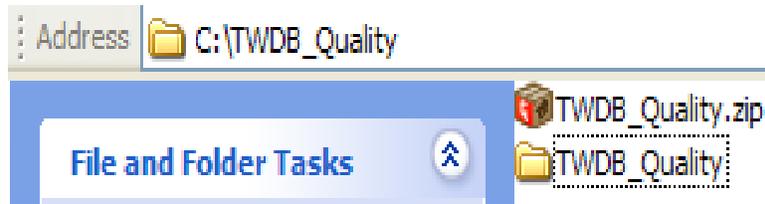
7. Once you have downloaded the file and saved it in your desired location, unzip the contents of the file downloaded for all future work. **Right click the downloaded file and unzip the files** with an application that is present on your local system that can unzip the contents of the file. I used the application 7-Zip (<http://www.7-zip.org>) to decompress the contents of the file.

Figure 9 : Extract the zipped database



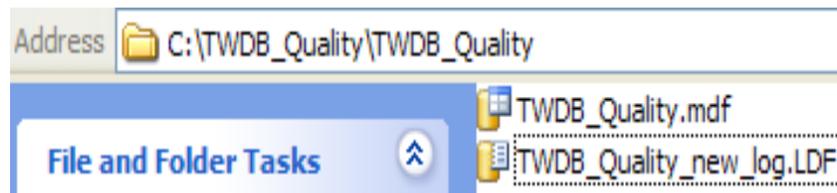
- Unzip the contents into a new folder called TWDB_Quality.

Figure 10 : Create a new folder for the database



- Open the folder and you should be able to find two files: **TWDB_Quality.mdf** and **TWDB_Quality_new_log.LDF**

Figure 11 : the SQL Server database and corresponding log file



- The first file **TWDB_Quality.mdf** is our database and the second file **TWDB_Quality_new_log.LDF** is the corresponding log file for this database.

So we have successfully downloaded the ODM database from downloads at CRWR into our local system. We can download the ODM Database for any of the layers by following the steps above.

4 IMPORTING THE ODM DATABASE INTO SQL SERVER 2005

This section illustrates how to import the ODM databases into SQL Server 2005. Since the native database format for the ODM database files which are provided for download is Microsoft SQL Server , we first illustrate how to import these files into SQL Server 2005.

I have already explained in section 2.2 how to install Microsoft SQL Server 2005 and Microsoft SQL Server Management Studio Express. It is assumed that we have all installed the SQL Server 2005 application and are all set to use SQL Server 2005 to import the ODM databases. Please refer to section 2.2 in case you have trouble installing the SQL Server 2005 applications on your system.

4.1 LOGGING INTO SQL SERVER 2005

1. We use Microsoft SQL Server Management Studio Express to import and view the database.
2. To open SQL Server Management Studio Express, go to **Start->All Programs-> Microsoft SQL Server 2005-> SQL Server Management Studio Express**.
3. Log on to the Management Studio Express, by using either Windows Authentication mode or by using a User name and password. It is always **preferred to use Windows Authentication** for logging on to the Management Studio Express.

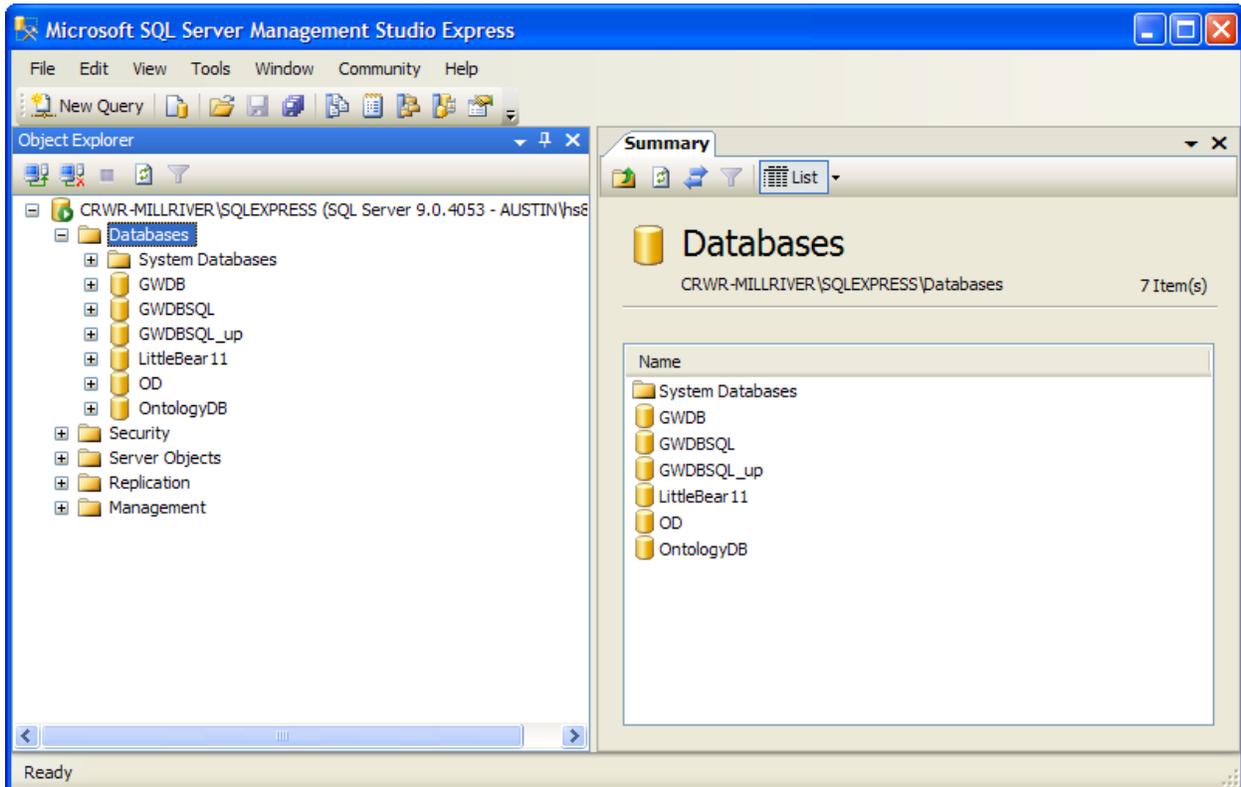
Figure 12: Log into the MS SQL Server 2005 Management Studio using Windows Authentication



4. To help you quickly locate the various tutorial sections that are associated with each component technology, the SQL Server tutorials are currently available at <http://msdn.microsoft.com/en-us/library/ms167593.aspx> . You can use these tutorials to get acquainted with SQL Server 2005.

4.2 IMPORTING THE DATABASE INTO SQL SERVER 2005

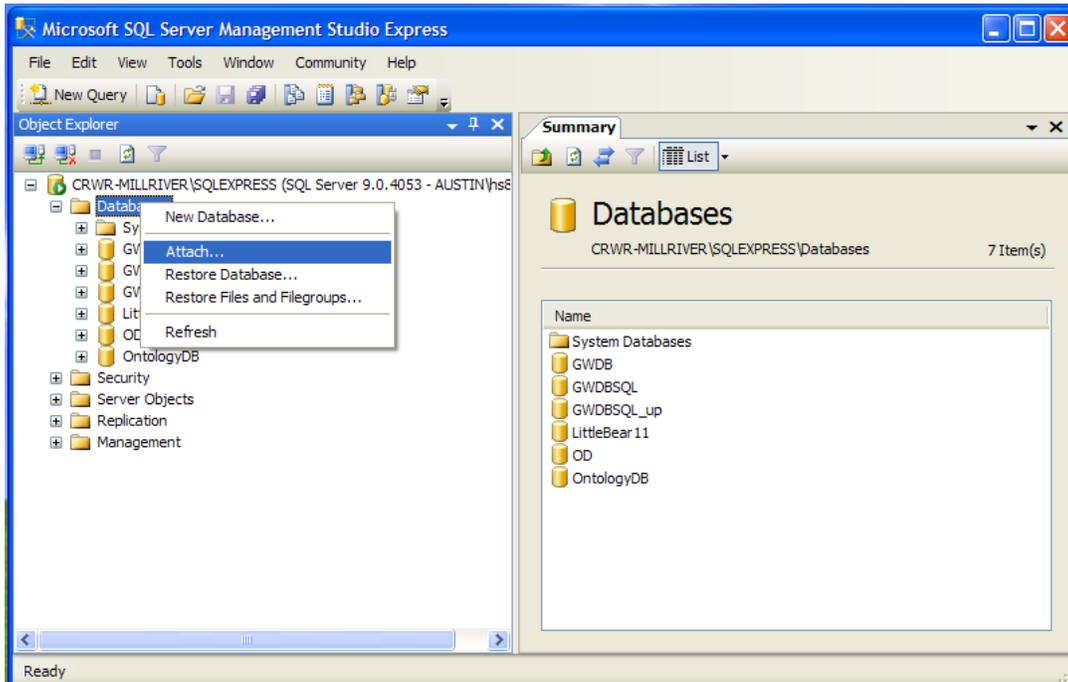
Figure 14: Expand the databases option in the Object Explorer



On expanding the databases tab you should be able to see all the databases that have been added. In case you don't have any databases attached to the Server you will only find the System Databases.

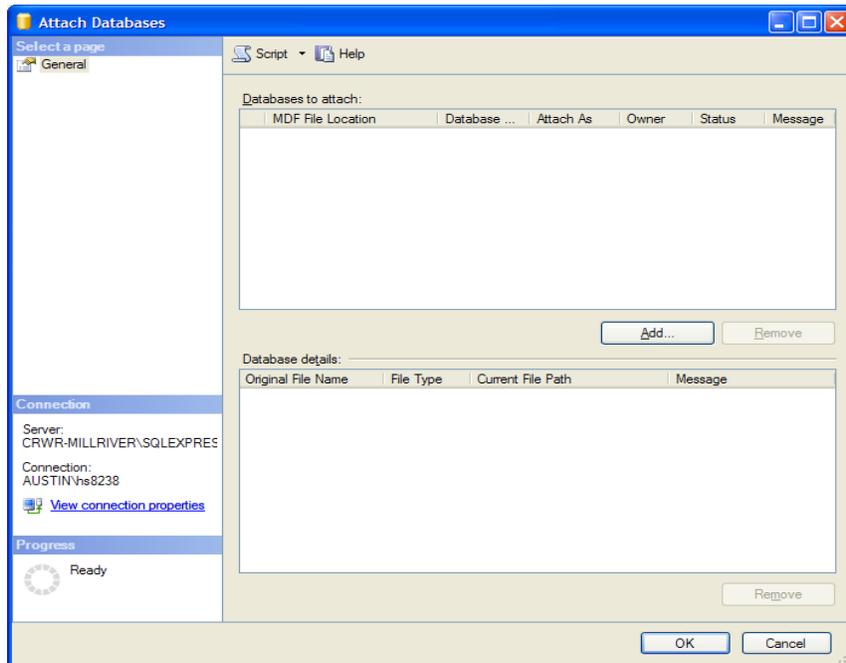
3. **Right click on the Databases folder icon** and you will be able to see a list of operations you can perform with the databases. We will use the option **“attach” to attach our databases** into the SQL server 2005. **Click on “Attach.”**

Figure 15 : Select the Attach option when you right click on the Databases icon



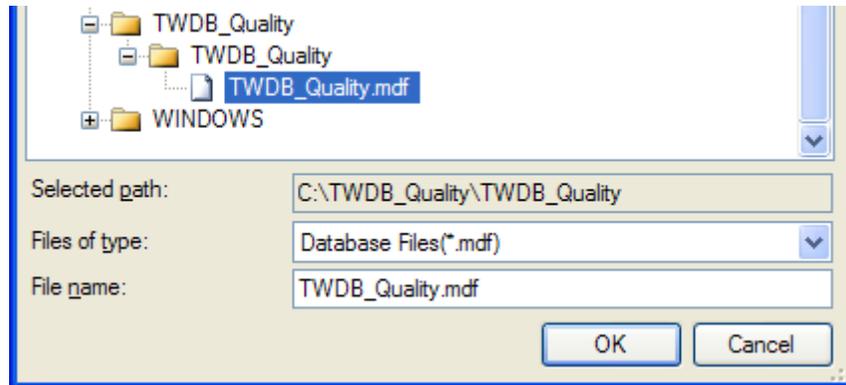
4. You will see a pop up window seeking instructions on what to attach and from which location.

Figure 16: Attach Databases



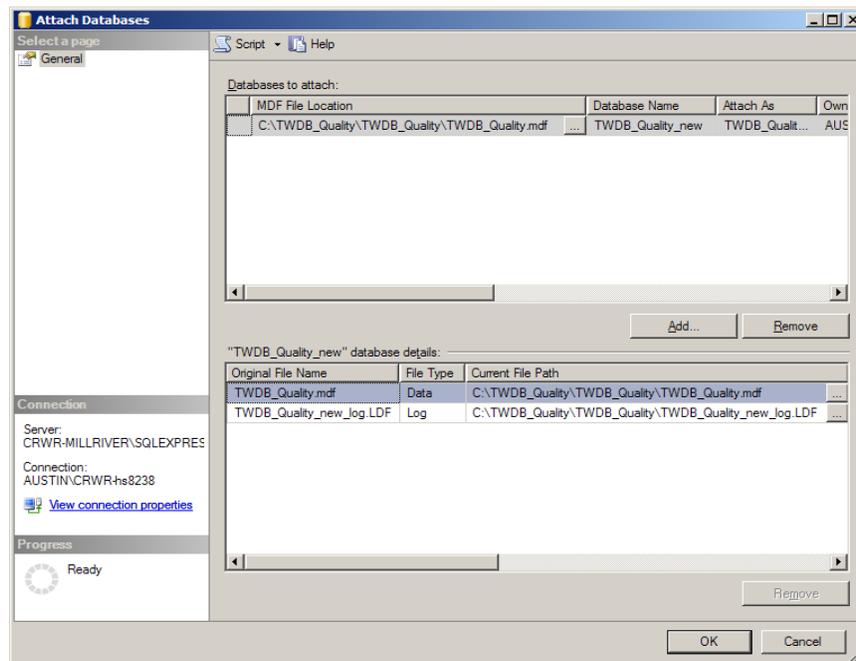
5. Click on the **Add** button and browse to the location where out TWDB_Quality.mdf is located and **select** it.

Figure 17: Select the TWDB_Quality.mdf file



6. Click **OK** and you will have the selected files added to the window.

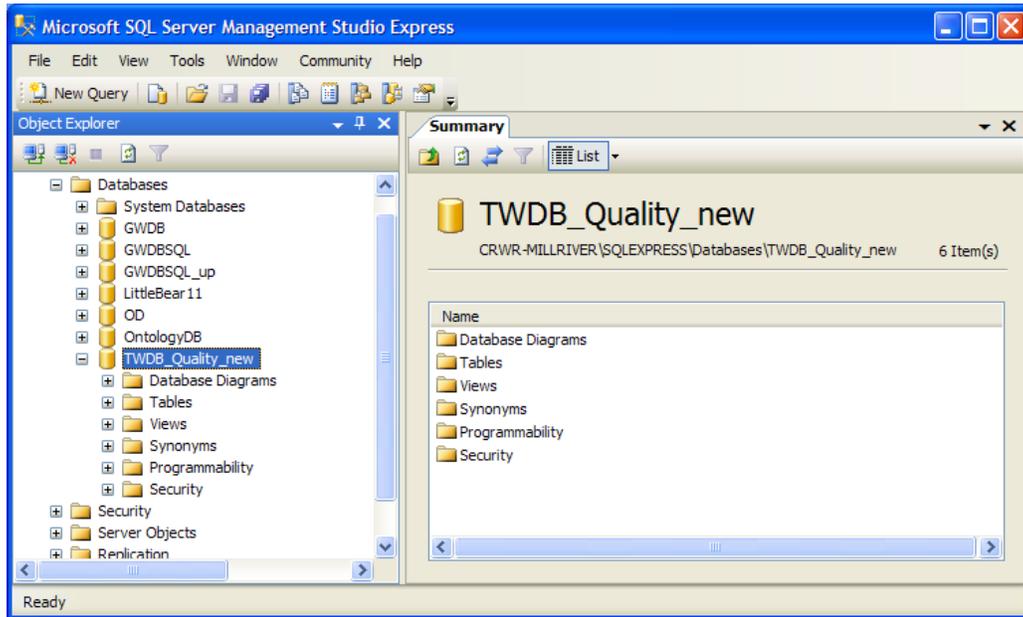
Figure 18 : Add the TWDB_Quality.mdf database file



On selecting the TWDB_Quality.mdf file the attach database wizard automatically adds the log file.

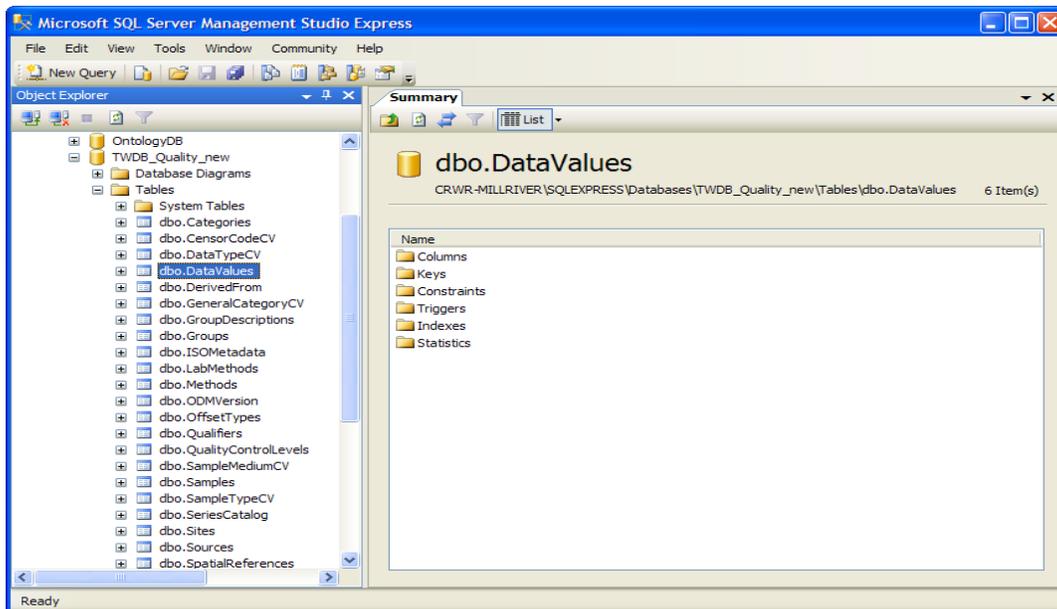
7. Click **OK** and you will have the database attached to the list of databases.
8. You should be able to see a new database added to your list of databases.

Figure 19: The TWDB_Quality_new has been added to the Databases



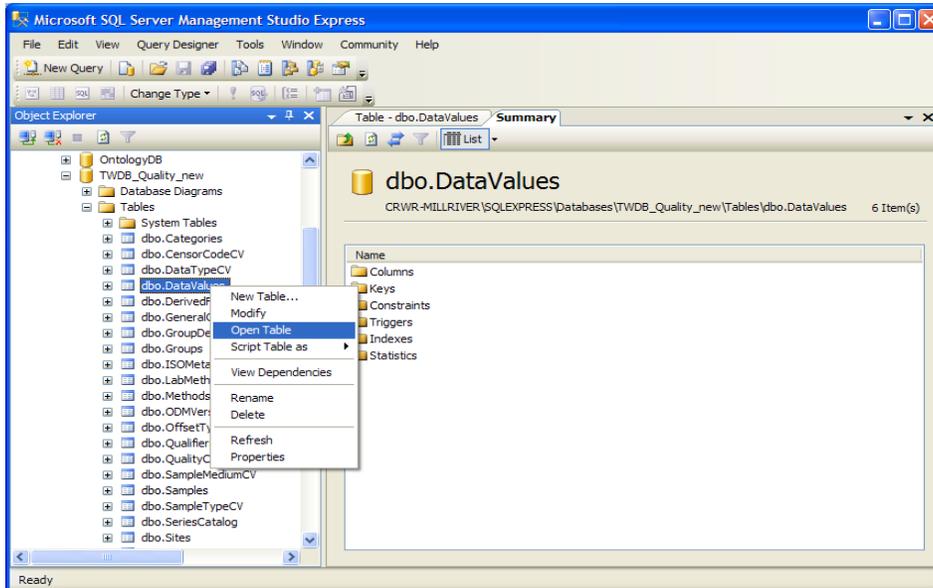
9. Expand the database and then the Tables to see the list of the tables in the Database.

Figure 20: Expand the Tables tab to view the list of tables in the database



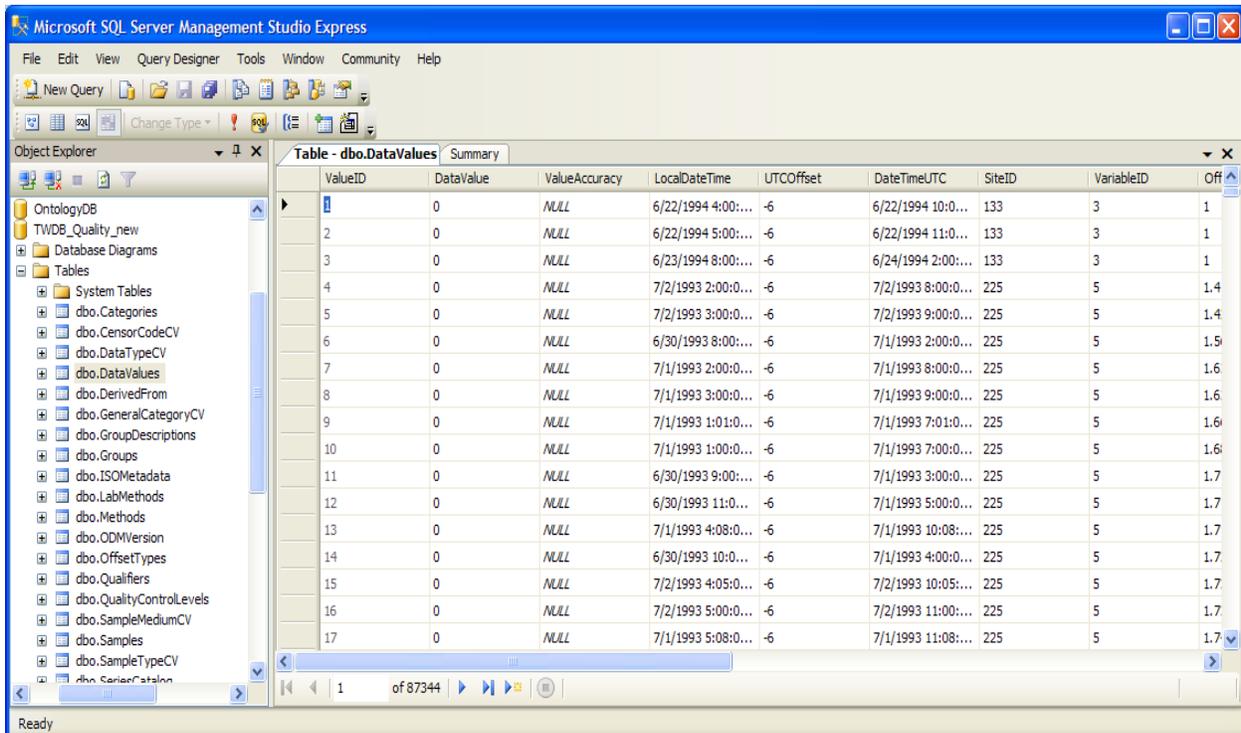
10. Right click on the DataValues table and select Open Table.

Figure 21: Open the Table DataValues to view the records



11. You should be able to see the list of records in the table.

Figure 22: Records of DataValues Table



We are done with importing the database into the SQL Server 2005. You can use your imagination to query the tables and derive results as required by you.

5 CONNECTING TO THE SQL SERVER 2005 DATABASE BY USING ODM TOOLS

This section illustrates how to connect to the database in SQL Server 2005 using ODM Tools. I have already explained in section 2.5 about ODM Tools on CUAHSI Website and have demonstrated steps on how to install the ODM Tools. In order to follow the instructions below I assume that you have installed the ODM Tools.

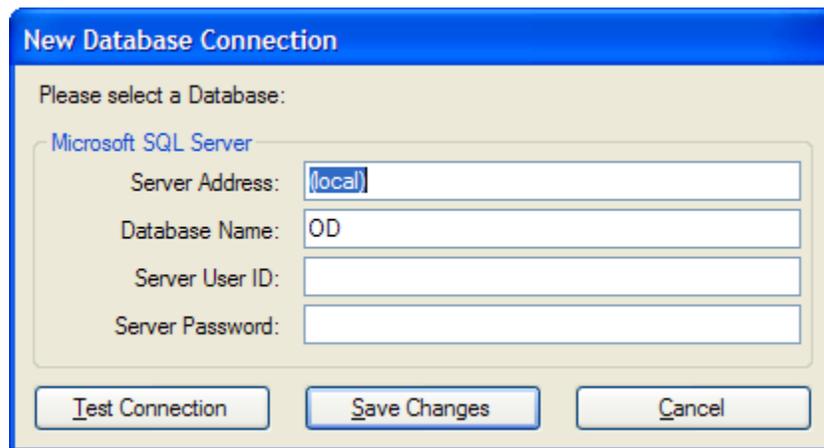
You can also download the latest version of ODM Tools 1.1.1 from this location. The CUAHSI ODM Tools Version 1.0 Design Specifications should a nice place to start; you can find this at http://his.cuahsi.org/documents/ODM_Tools_Design_Specifications.pdf

For more information about the ODM Tools please refer to section 2.5 or visit <http://his.cuahsi.org/odmtools.html>.

5.1 SETTING THE SA ACCOUNT TO CONNECT TO THE DATABASE

1. Start the ODM Tools from the windows **Start ->All Programs -> CUAHSI HIS -> ODM Tools 1.1**.

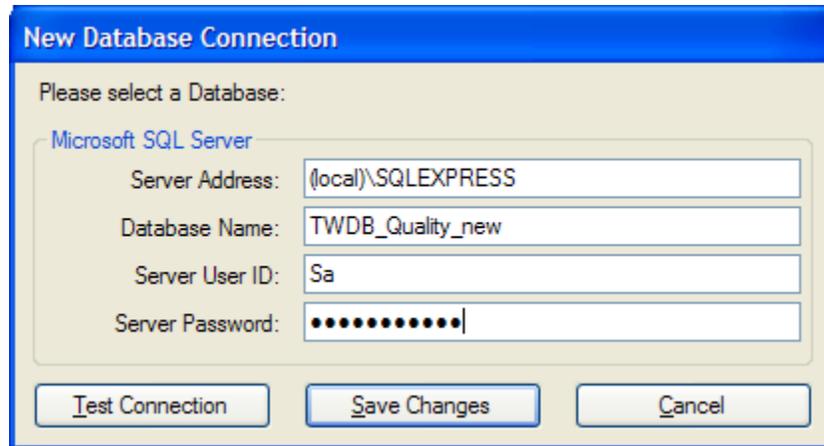
Figure 23: The login Dialog to ODM Tools



2. A dialog will appear and ask for Server Address, Database to connect, Server User ID, and Server Password.
3. **Fill** the Server Address as “(local)\SQLEXPRESS”.
4. **Type** the database you want to connect, here it will be “TWDB_Quality_new”.
5. **Use** the User Name “Sa”.
6. Type in the password for User Sa. In case you have not been able to set the SA account for your database please refer to the Troubleshooting Section to find instructions on how to set up the SA Account.

7. **Click on the Test Connection** to check if the login is successful, and then click on Save Changes to access the ODM Tools.

Figure 24 : login screen for ODM Tools



8. If the user name and password is correct and the database name has been entered properly you will see a Connection Successful message.

Figure 25: Database Connection Successful



Tip:

- You should provide the name of the Database as it is in SQL Server 2005.**
- You should have required privileges to connect to the database.**
- You should install and use the latest version of the ODM Tools available.**
- You cannot connect to SQL Server by using the Windows Authentication.**
- You have to use the SA account to connect to the database.**

So now that you have connected to the database you can use the CUAHSI ODM Tools Version 1.0 Design Specifications located at http://his.cuahsi.org/documents/ODM_Tools_Design_Specifications.pdf for exploring the ODM Tools.

6 IMPORTING ODM DATA INTO MICROSOFT EXCEL

This section illustrates methods to connect to SQL Server 2005 from MS Excel and import database tables into MS Excel for further analyses.

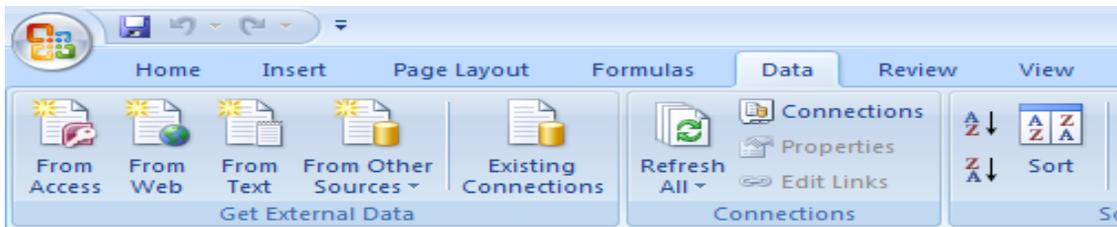
Just in case you don't have Microsoft Excel installed on your desktop, you can refer to the section 2.3 for more information about installing MS Excel.

Microsoft Excel is one of the most widely used tools in the scientific field due to its simplicity and ability to handle a wide range of scenarios.

6.1 IMPORTING SQL SERVER 2005 ODM DATABASES INTO EXCEL

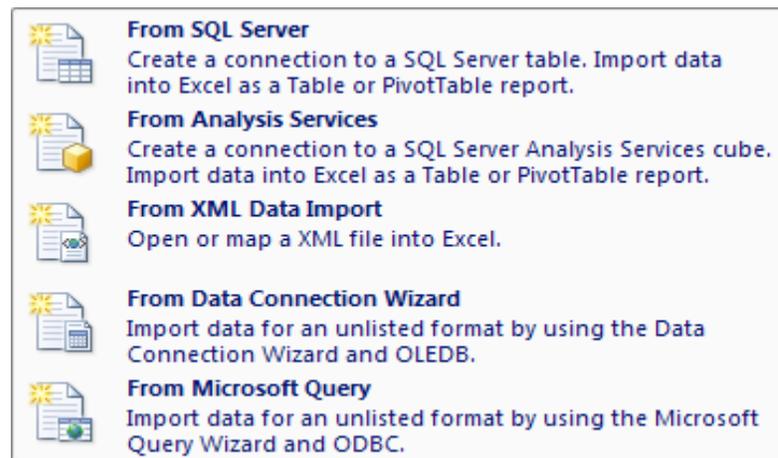
1. **Open** an empty Excel workbook.
2. **Click** on the **Data Tab**

Figure 26 : Click the Data Tab MS Excel



3. **Click** on the Icon **"From Other Sources"** and you will see a list of options from which you can import data into Excel as a Table or a Pivot Table Report.

Figure 27 : Options available for connecting to other sources in MS Excel



4. **Select "From SQL Server"** and a Data Connection Wizard will appear.

Figure 28 : Data Connection Wizard in MS Excel

Data Connection Wizard

Connect to Database Server

Enter the information required to connect to the database server.

1. Server name:

2. Log on credentials

Use Windows Authentication

Use the following User Name and Password

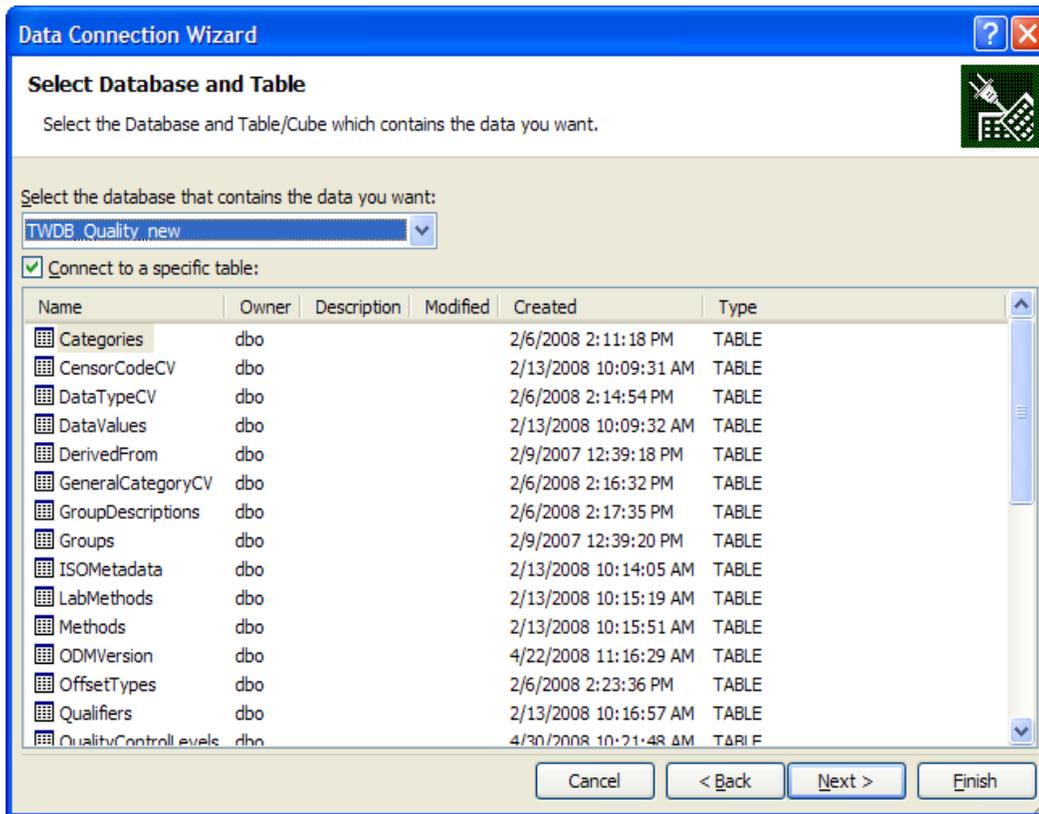
User Name:

Password:

Cancel < Back Next > Finish

5. **Specify the Server Name** on your Local Machine.
6. You can select to Use Windows Authentication or a User Name and Password to connect to the database. It is **preferable to use Windows Authentication** to Connect to the database.
7. Once you have filled the required fields click **Next**
8. The next page will ask you to **Select Database and Table**.
9. The default database selected would be the Master Database. **Click on the drop down to select the database TWDB_Quality_new**.

Figure 29 : The list of tables in TWDB_Quality_new database

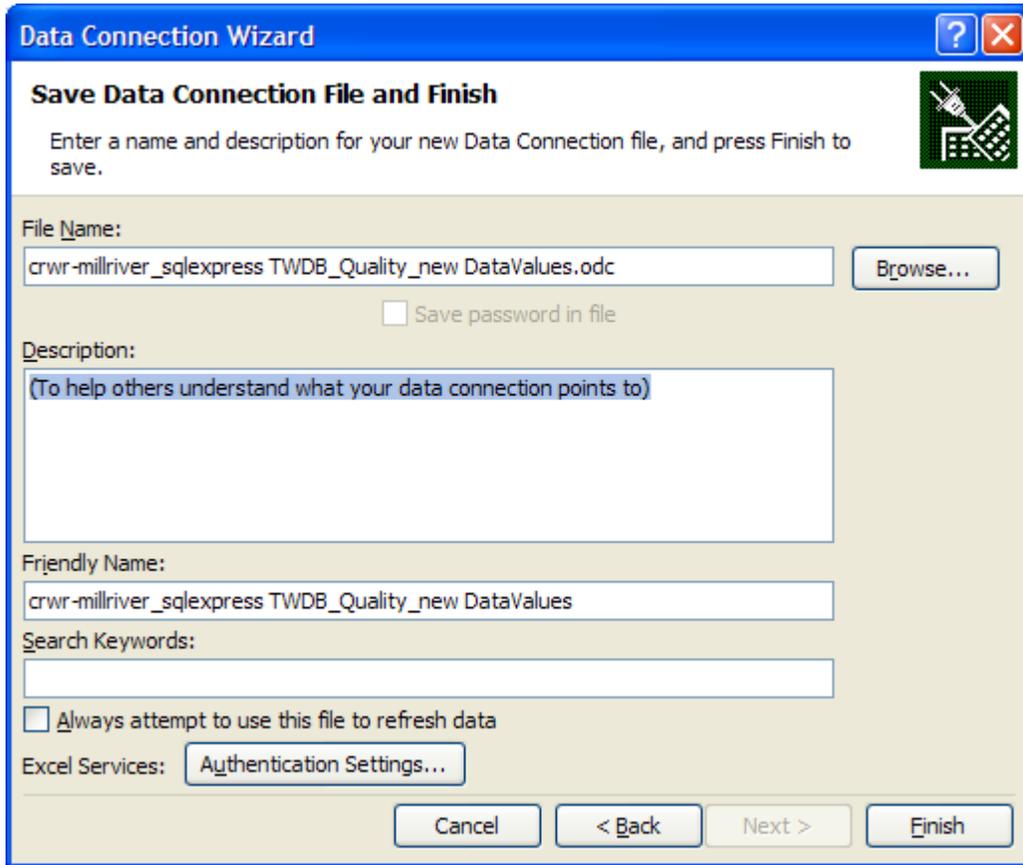


10. Select a table that you want to view in the Excel file and Click Next. For the purpose of the tutorial I have **selected the DataValues** Table and hit **Next**.

11. The next step will create a data connection file, which could be used to connect to the database table if you intend to connect to this table often and work on its data.

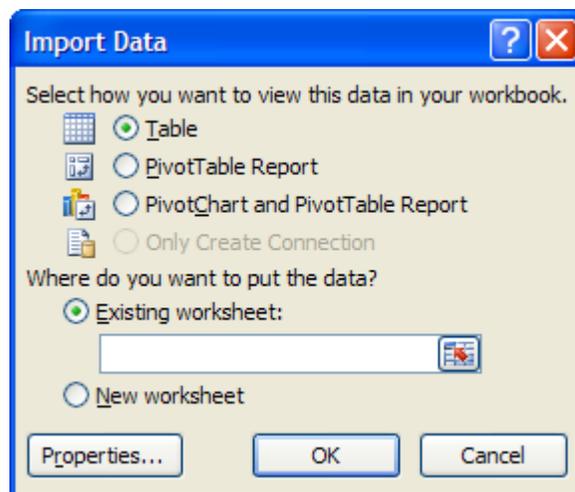
By connection files I mean files which contain all the information and parameters needed to form a data connection, such as server name, OLAP data cube or table name, and query. In our case, we can simply accept the default settings.

Figure 30 : Create a data connection file and finish



12. Leave the default settings as it is hit the **Finish button**.
13. You will be asked to if you want to import the data into the same worksheet as a table, Pivot tables, or as a report. Check the Table properties and existing worksheet and hit Ok.

Figure 31 : Chose appropriate options



14. You will see the table imported from the SQL Server 2005 database into an Excel worksheet.

Figure 32 : View of DataValues table in MS Excel

	A	B	C	D	E	F	G	H	I	J	K	L
1	ValueID	DataValue	ValueAccuracy	LocalDateTime	UTCOffset	DateTimeUTC	SiteID	VariableID	OffsetValue	OffsetTypeID	CensorCode	Qualif
2	1	0		6/22/1994 16:00	-6	6/22/1994 22:00	133	3	1	1	nc	
3	2	0		6/22/1994 17:00	-6	6/22/1994 23:00	133	3	1	1	nc	
4	3	0		6/23/1994 20:00	-6	6/24/1994 2:00	133	3	1	1	nc	
5	4	0		7/2/1993 2:00	-6	7/2/1993 8:00	225	5	1.4	1	nc	
6	5	0		7/2/1993 3:00	-6	7/2/1993 9:00	225	5	1.42	1	nc	
7	6	0		6/30/1993 20:00	-6	7/1/1993 2:00	225	5	1.56	1	nc	
8	7	0		7/1/1993 2:00	-6	7/1/1993 8:00	225	5	1.62	1	nc	
9	8	0		7/1/1993 3:00	-6	7/1/1993 9:00	225	5	1.62	1	nc	
10	9	0		7/1/1993 1:01	-6	7/1/1993 7:01	225	5	1.66	1	nc	
11	10	0		7/1/1993 1:00	-6	7/1/1993 7:00	225	5	1.68	1	nc	
12	11	0		6/30/1993 21:00	-6	7/1/1993 3:00	225	5	1.7	1	nc	
13	12	0		6/30/1993 23:00	-6	7/1/1993 5:00	225	5	1.7	1	nc	
14	13	0		7/1/1993 4:08	-6	7/1/1993 10:08	225	5	1.7	1	nc	
15	14	0		6/30/1993 22:00	-6	7/1/1993 4:00	225	5	1.72	1	nc	
16	15	0		7/2/1993 4:05	-6	7/2/1993 10:05	225	5	1.72	1	nc	
17	16	0		7/2/1993 5:00	-6	7/2/1993 11:00	225	5	1.72	1	nc	
18	17	0		7/1/1993 5:08	-6	7/1/1993 11:08	225	5	1.74	1	nc	
19	18	0		7/2/1993 6:05	-6	7/2/1993 12:05	225	5	1.74	1	nc	

7 IMPORTING ODM DATABASES INTO MICROSOFT ACCESS

This section illustrates methods about setting up an ODBC Data Source administrator. Then we will look at importing SQL Server 2005 Databases into MS Access. We assume that you have Microsoft Access installed on your systems. Microsoft Access is a relational database management system with a graphical user interface and software development tools. For more information about MS Access please visit the wiki page for MS Access http://en.wikipedia.org/wiki/Microsoft_Access .

In case you don't have MS Access installed on your system, please refer to section 2.3 for more information about the installation process.

7.1 ODBC DATA SOURCE ADMINISTRATOR

ODBC Data Source Administrator is used to create and manage ODBC data sources. The ODBC Data Source Administrator is a Windows component only.

The Microsoft Open Database Connectivity (ODBC) interface is a C programming language interface that makes it possible for applications to access data from a variety of database management systems (DBMSs). ODBC is a low-level, high-performance interface that is designed specifically for relational data stores.

The ODBC interface allows maximum interoperability—an application can access data in diverse DBMSs through a single interface. Moreover, that application will be independent of any DBMS from which it accesses data. Users of the application can add software components called drivers, which interface between an application and a specific DBMS.

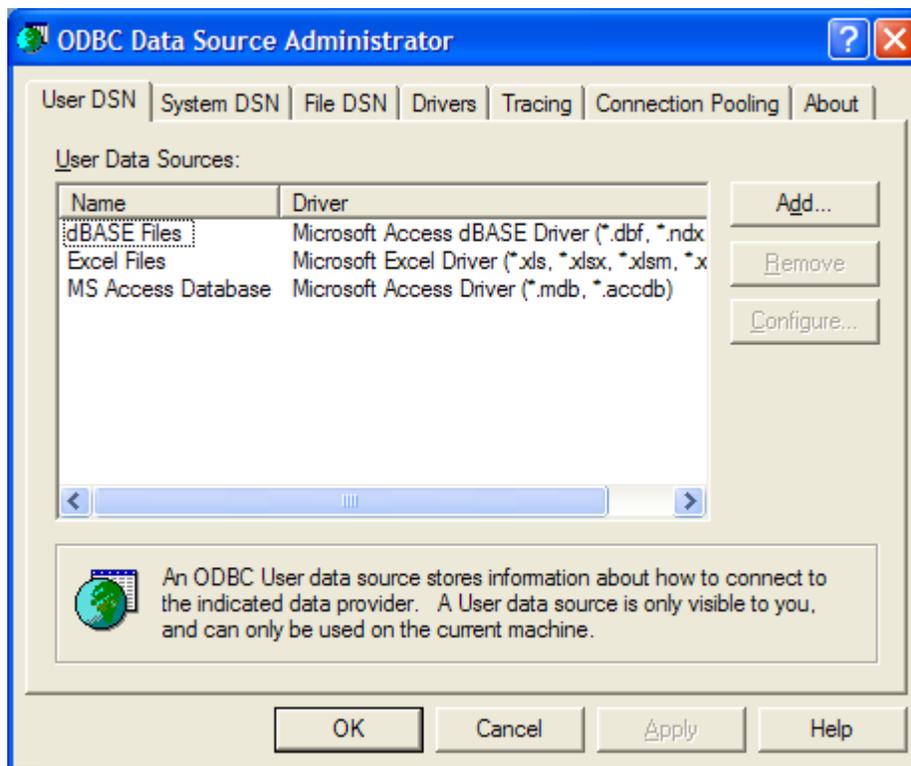
7.1.1 CREATING AN ODBC CONNECTION

The below steps are for Windows XP applications. For information on how to locate the ODBC tools on other windows application please refer to <http://msdn.microsoft.com/en-us/library/ms710252%28VS.85%29.aspx>.

To open the ODBC Data Source Administrator in Windows XP

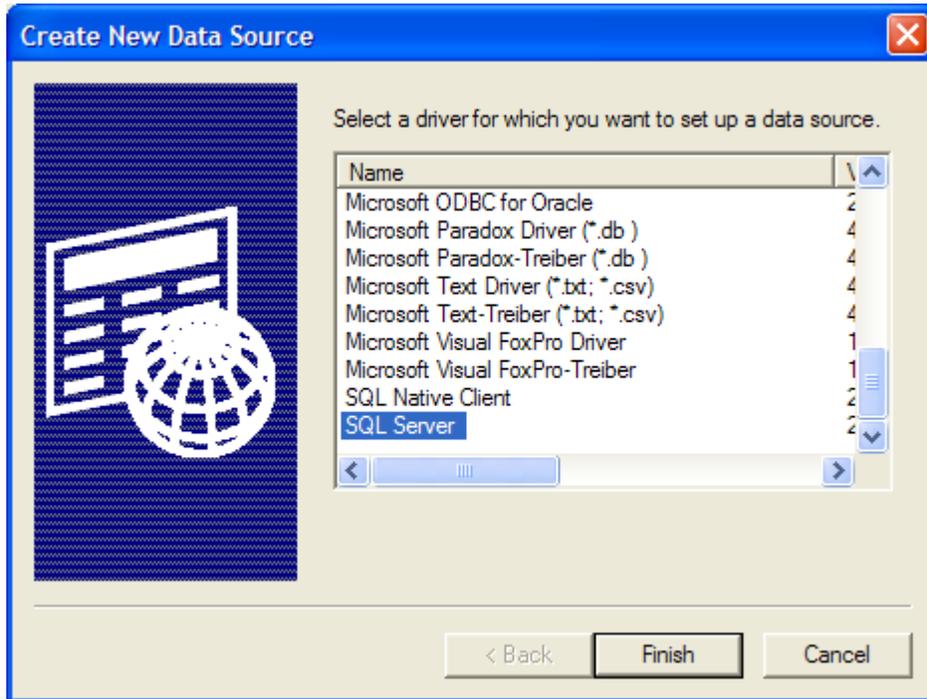
1. On the Start menu, **click Control Panel**.
2. In Control Panel (**Category View**), **click Performance and Maintenance**, and **then click Administrative Tools**, or in **Control Panel (Classic View)**, **click Administrative Tools**.
3. In Administrative Tools, **click Data Sources (ODBC)**.
4. I have assumed that you don't have a DSN set up for your SQL Server.

Figure 33 : Setting up the data source administrator



5. Click on **Add**.

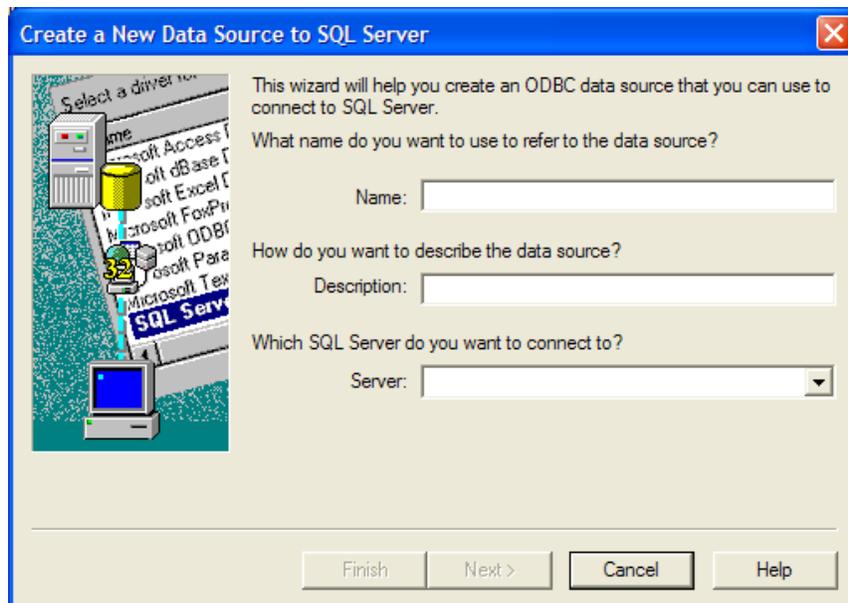
Figure 34: Create a New Data Source



Scroll down towards the end of the dialog and select the driver for SQL Server. This will enable you to select the SQL Server driver setup.

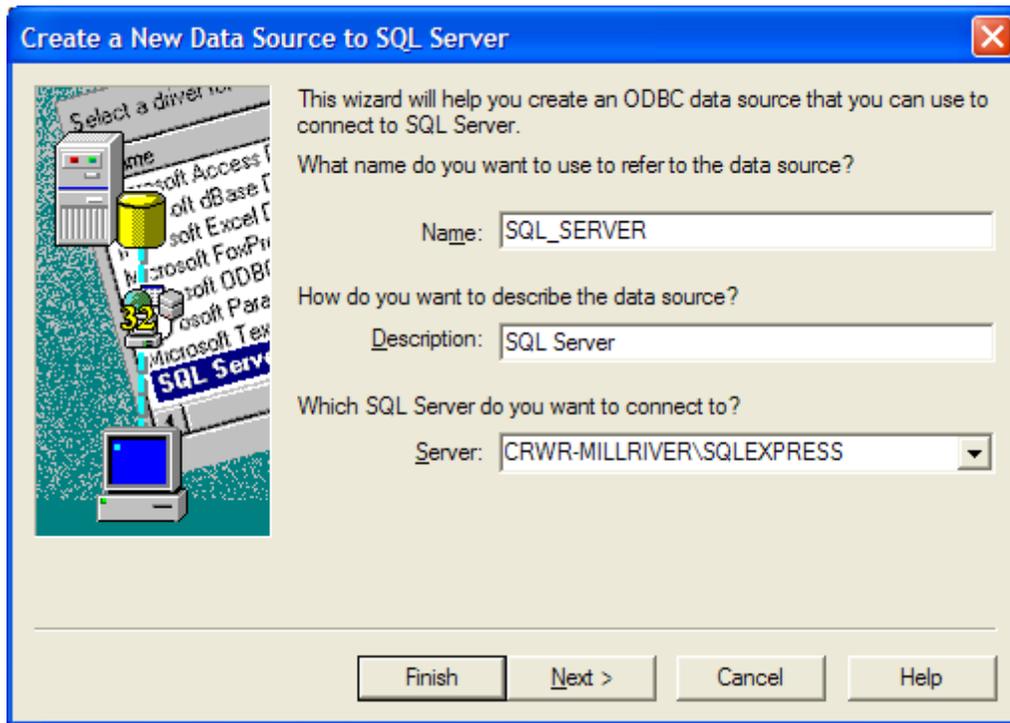
6. **Select SQL Server** and hit **Finish**.

Figure 35: Enter the Server Properties



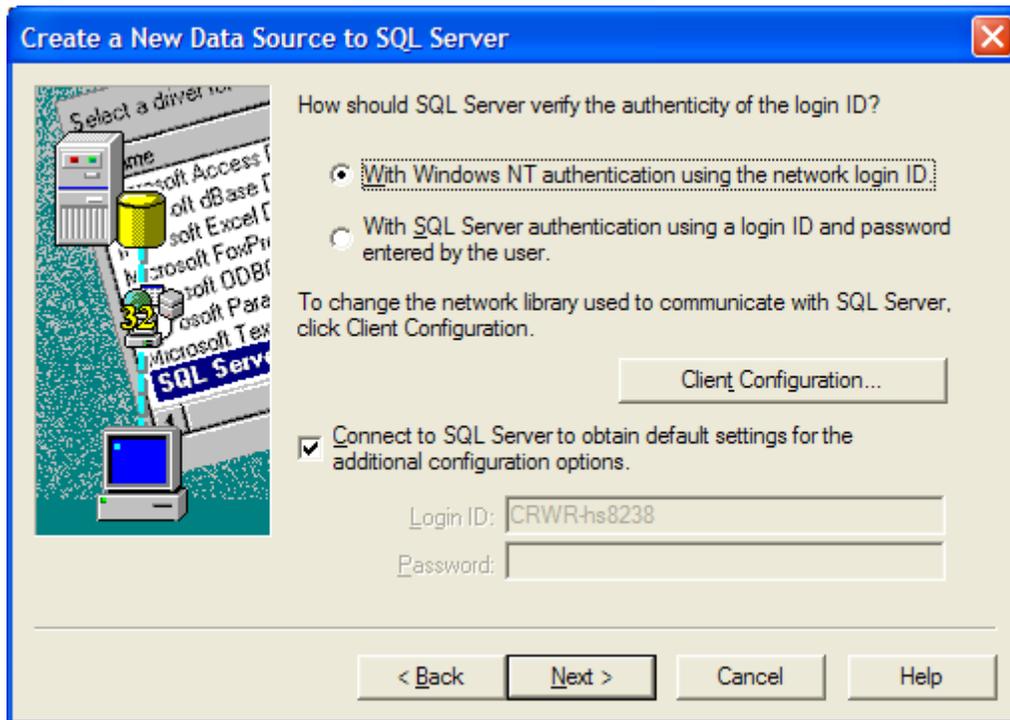
7. Add the **Data Source Name** as **"SQL_SERVER"**, Type the **description** as **"SQL Server"** and the **Server** as **CRWR-MILLRIVER\SQLEXPRESS**. The Server you want to connect will vary. Please make sure that you enter the Name of the server that is configured for your system. In case you are having trouble to find out the name of the SQL Server on your machine, please refer to the Troubleshooting section.

Figure 36: Add the details for SQL Server



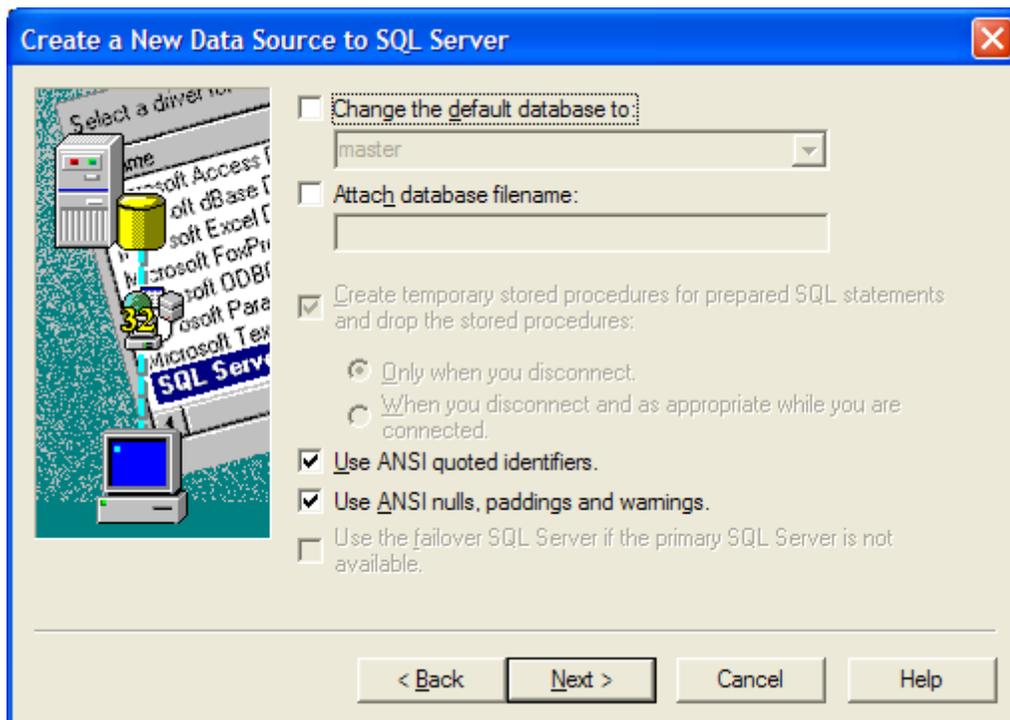
8. **Click on Next.** On the next screen you will be prompted to choose the SQL Server authenticity of the login ID. You can choose to login with your Windows NT authentication ID or use a SQL Server authentication login ID and password. I would prefer logging into the Server by using Windows NT authentication ID. So leave the default settings as it is and move ahead.

Figure 37: Leave the default settings as it is



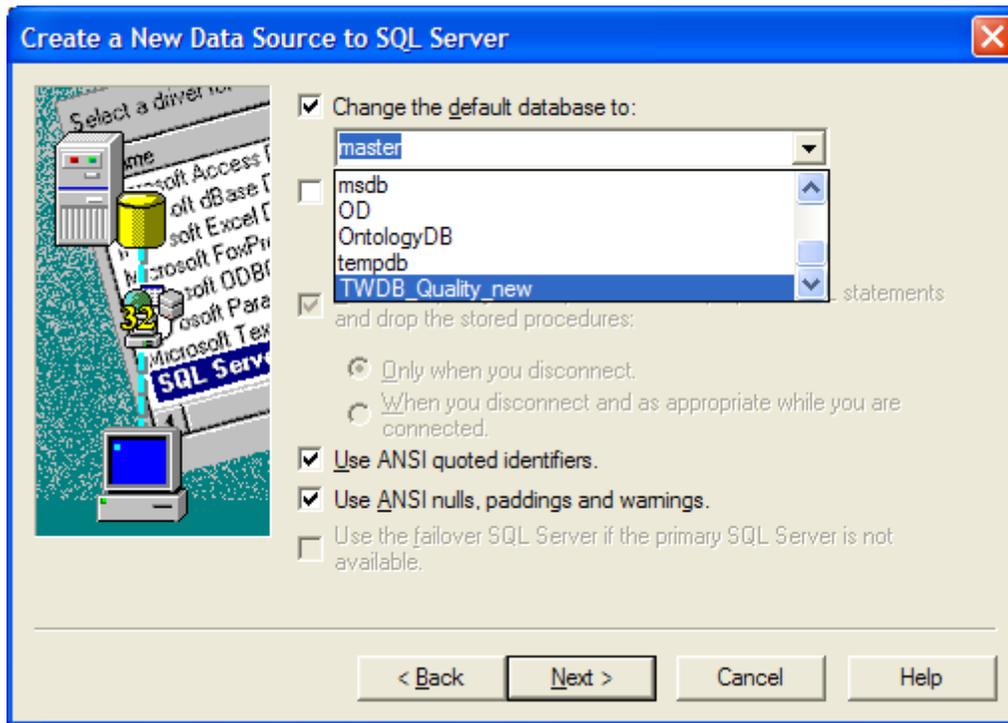
9. Hit Next

Figure 38: Change the default database to TWDB_Quality_new



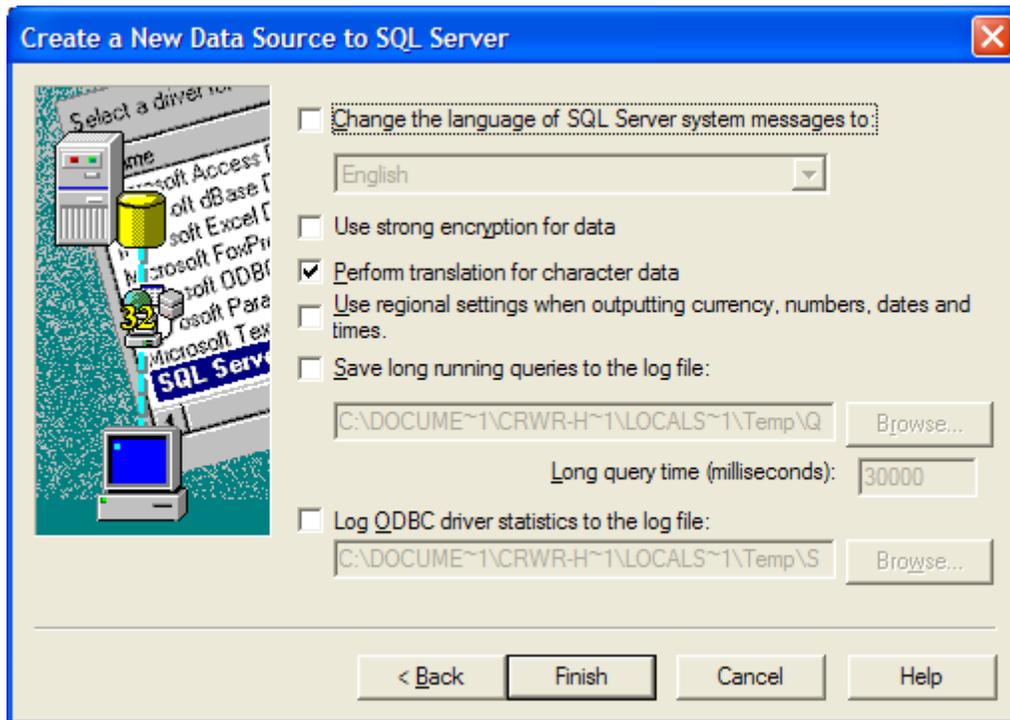
10. Check the box for “Change the default database to:” and scroll down to the database TWDB_Quality_new and select it. Leave all other settings as it is, and click **NEXT**

Figure 39: Check the box and scroll down to TWDB_Quality_new



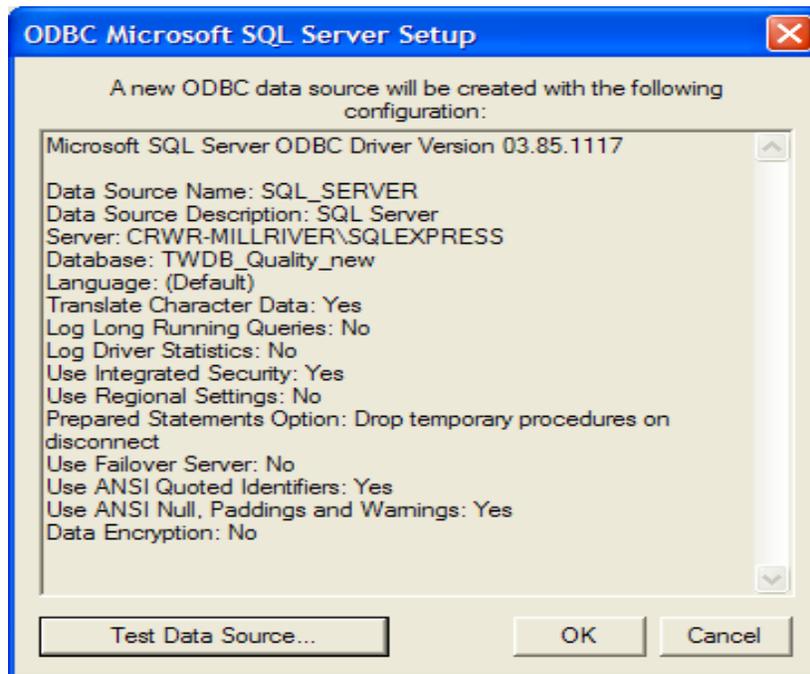
11. The next dialog will ask for instructions if you would like to change the Server language. If you don't want to change the language, then **leave the settings as default** and **click the finish** button.

Figure 40: Leave the settings as default



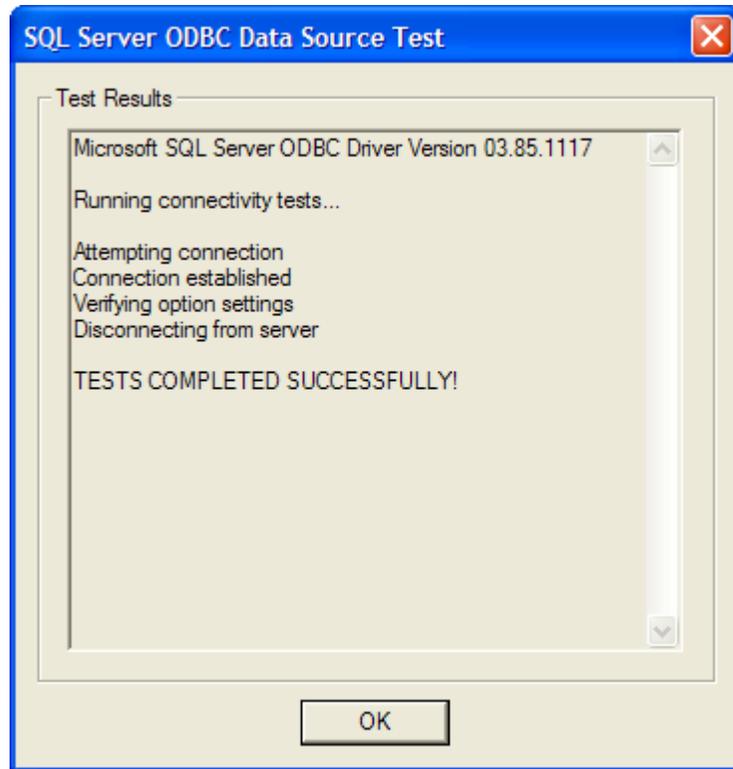
12. Congratulations! A new data source has been created.

Figure 41: New Data Source is created



13. Hit the **Test Data Source** button and you should be able to see Test completed successfully.

Figure 42 : Test the data source connection



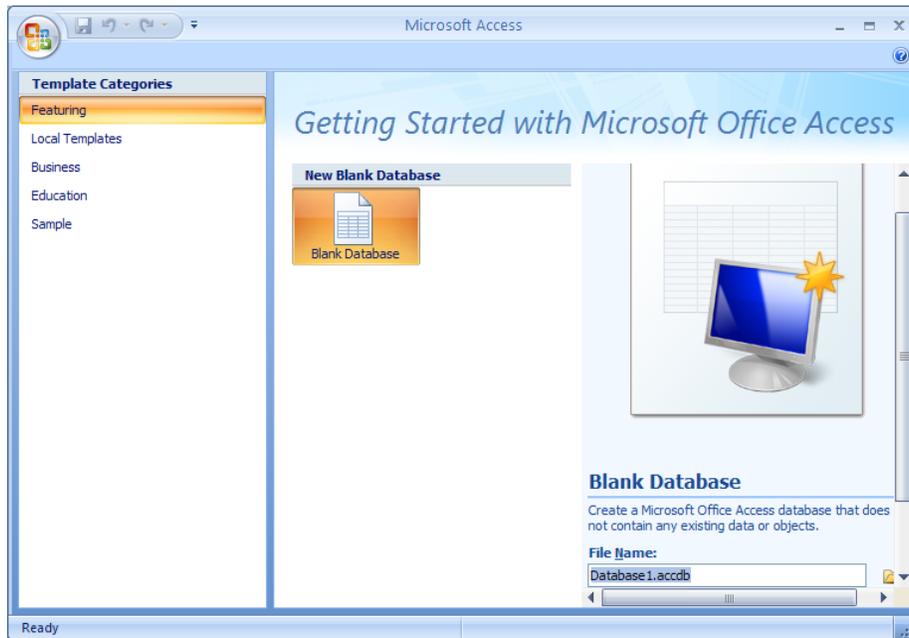
So we are done with our initial settings and we are set to connect with the SQL Server database from MS Access.

7.1.2 CONNECTING TO THE DATABASE FROM MICROSOFT ACCESS

This section will illustrate the steps to create a blank MS Access database and how to connect to the SQL Server 2005 to import our database TWDB_Quality_new into MS Access. It has been assumed that you have already installed MS Access on your system.

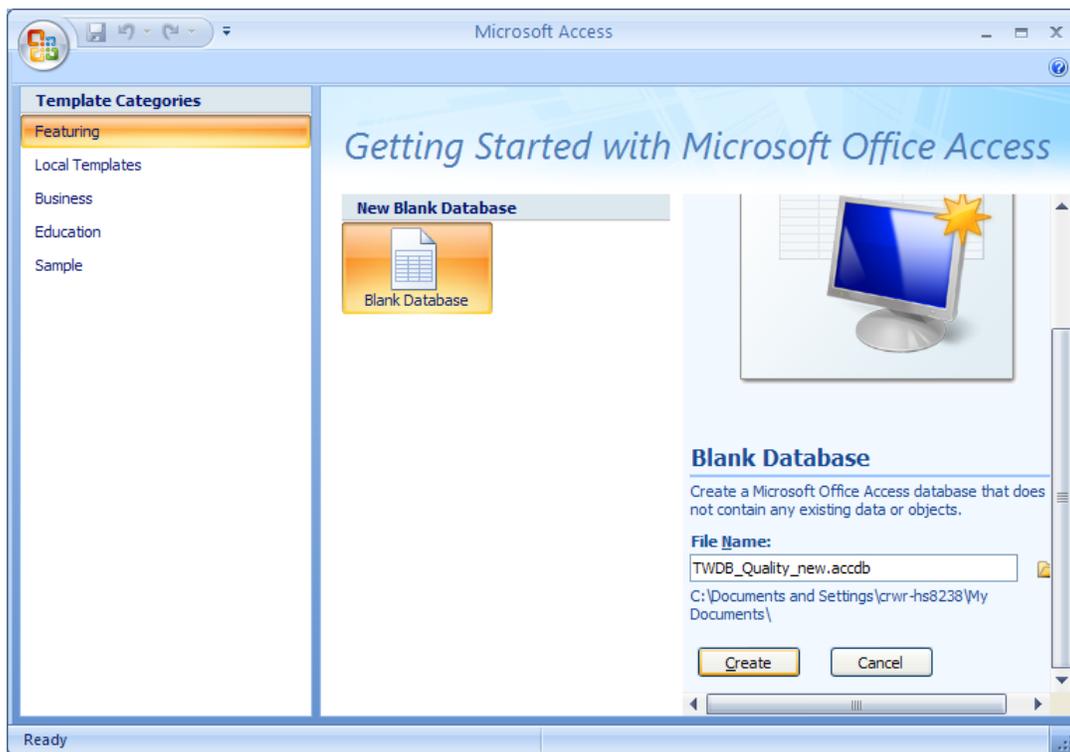
1. Log on to **Windows->Start->All programs->Microsoft Office->Microsoft Office Access 2007.**
2. **Click on Blank Database.**

Figure 43: Create a new blank database



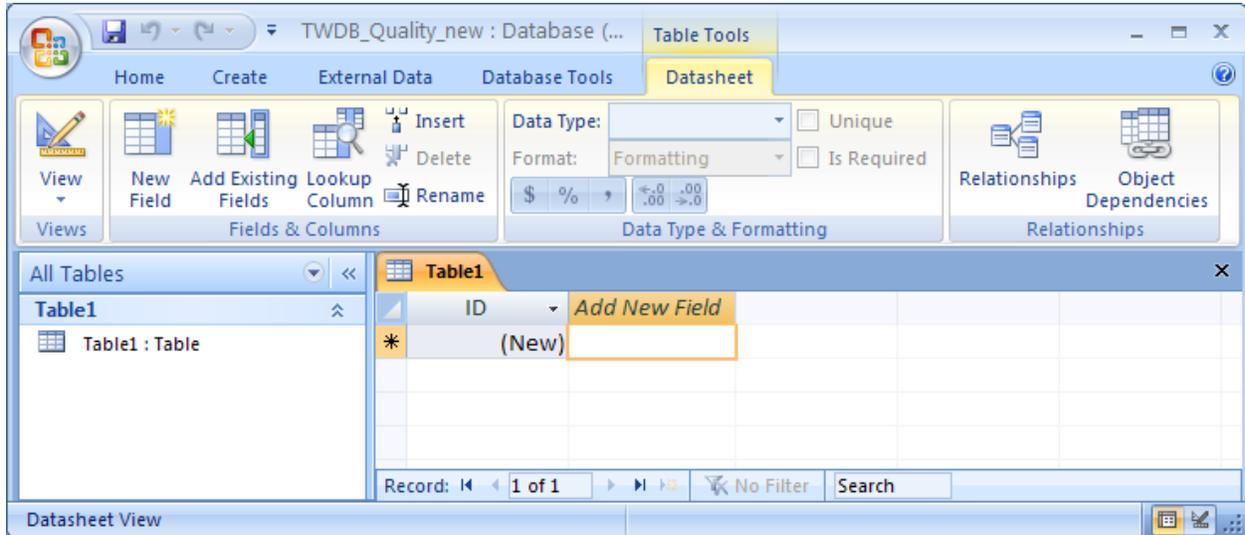
3. On the right hand side of screen you will be prompted to give a file name. **Type in the file name as “TWDB_Quality_new.accdb”.**

Figure 44: Type the file name as TWDB_Quality_new



4. Click Create.

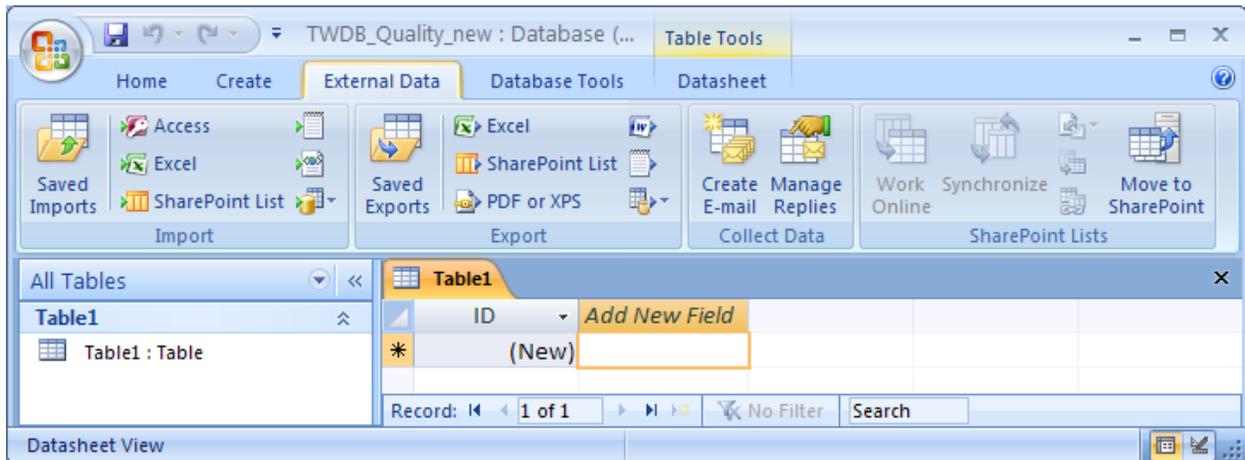
Figure 45: The TWDB_Quality_new database has been created



This creates a blank database named TWDB_Quality_new. This database has a single default table named Table1.

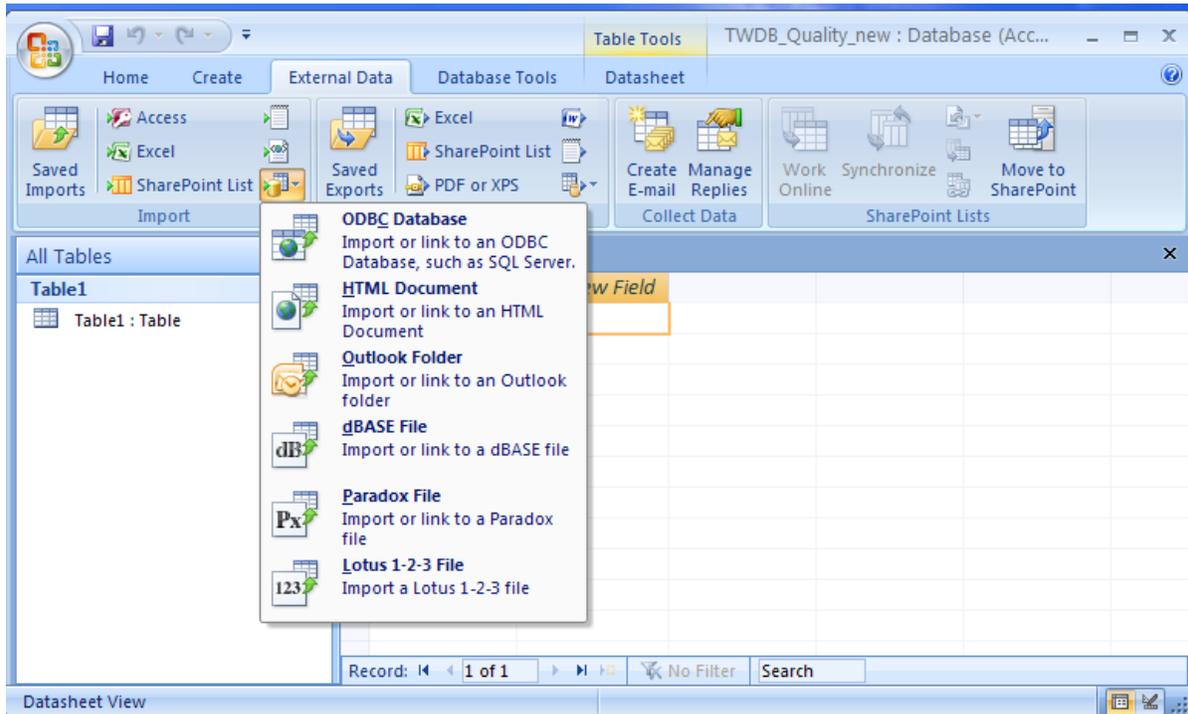
5. Navigate to the External Data tab on the Task bar at the top.

Figure 46 : click on the external data tab for connecting to other ODBC sources



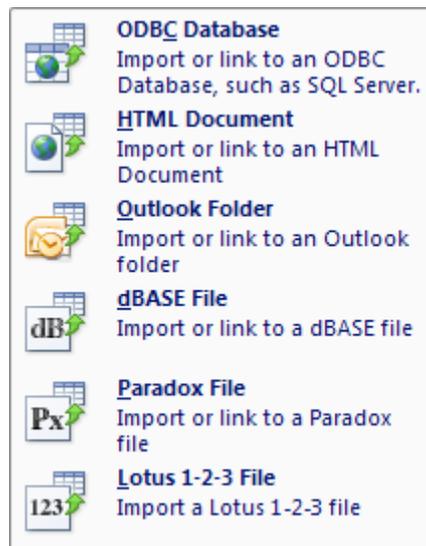
6. Click on the Icon MORE. This icon is just next to share point list icon.

Figure 47: Click on the Icon More for options



You will see a drop down list of options. We will select ODBC Database to import the database from SQL Server.

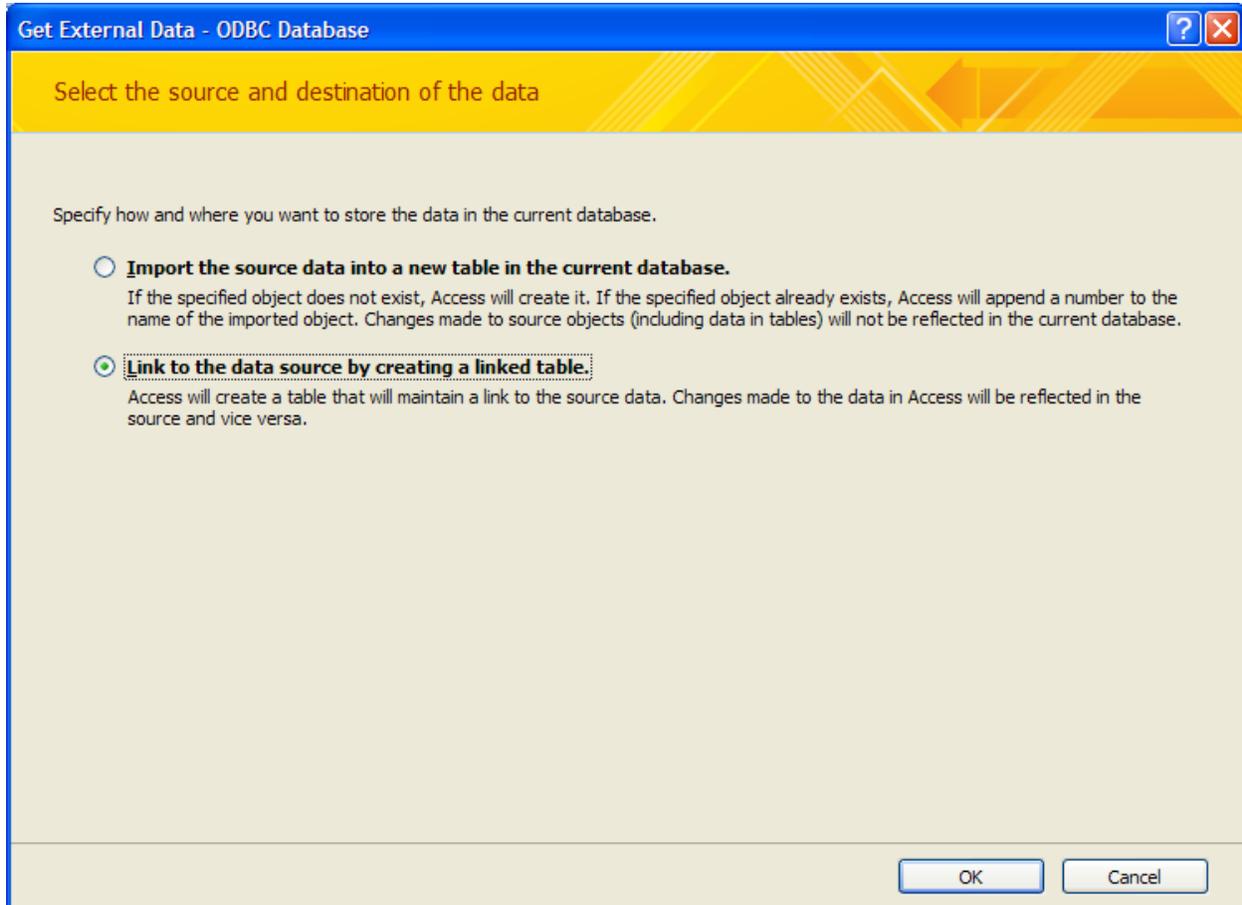
Figure 48 : Available list of options



7. Click on the ODBC Database and you will see a wizard to get external data.

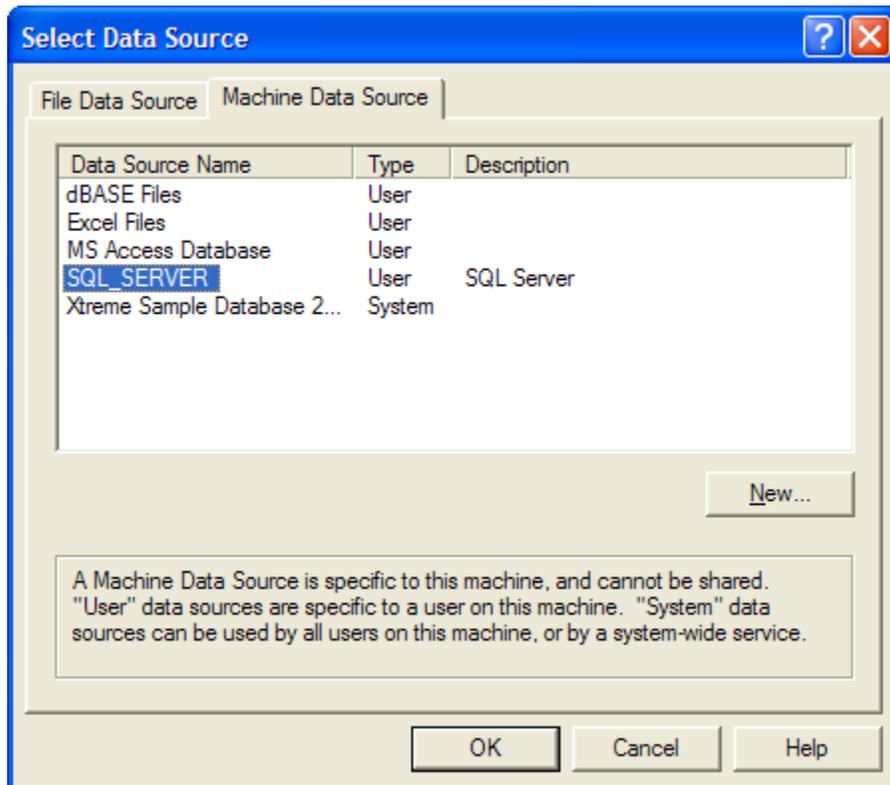
8. Check the box against “Link to the data source by creating a linked table” and hit OK

Figure 49 : get external database connection wizard



9. You will be prompted to select the data source. Click the Tab machine data source and select the SQL_SERVER source and click OK

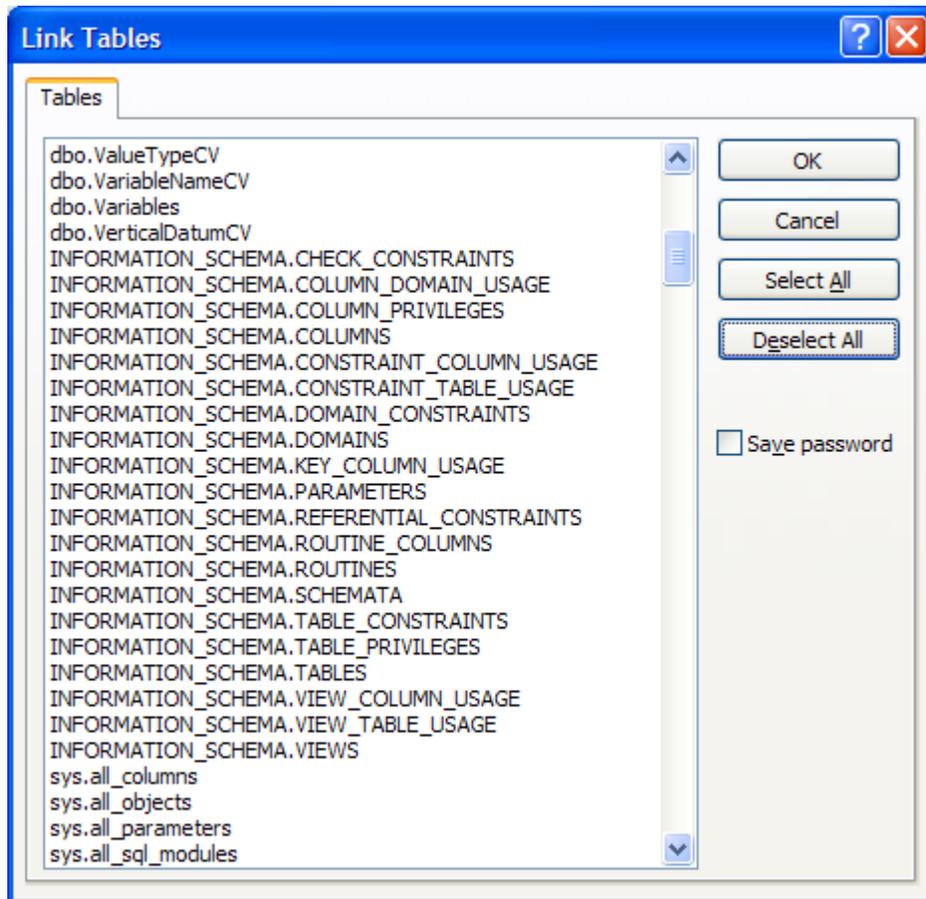
Figure 50 : Select the Machine Data Source and then select SQL_SERVER



10. You will then see a list of all the tables in the database. The list below is a list of all the information, system, and CUAHSI tables that have been created in the database. In order to add the tables we have an option to either Select All or to select tables that are necessary to us. I would suggest we select all the tables that start with the prefix "dbo.", so that we have all the CUAHSI tables imported into our database that we just created in MS Access.

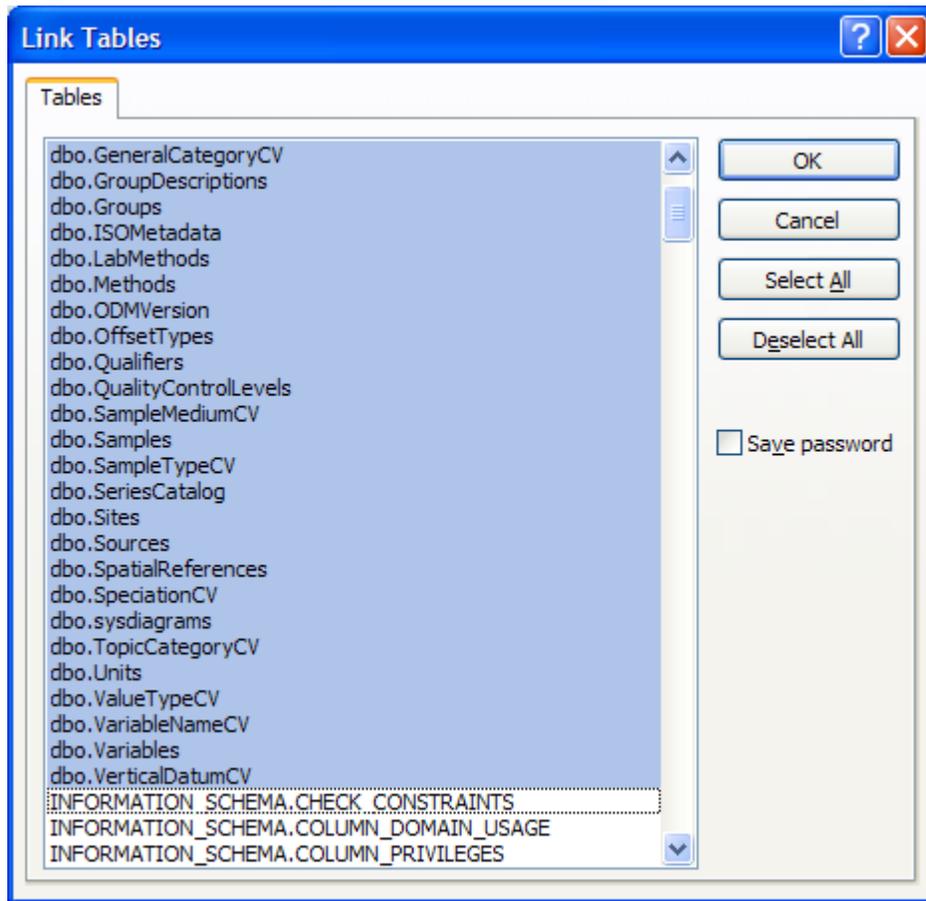
This will reduce the redundancy to go through the same steps every time we will want to import a new table from the SQL Server database into the MS Access database.

Figure 51: Select the tables you want to add to the MS Access



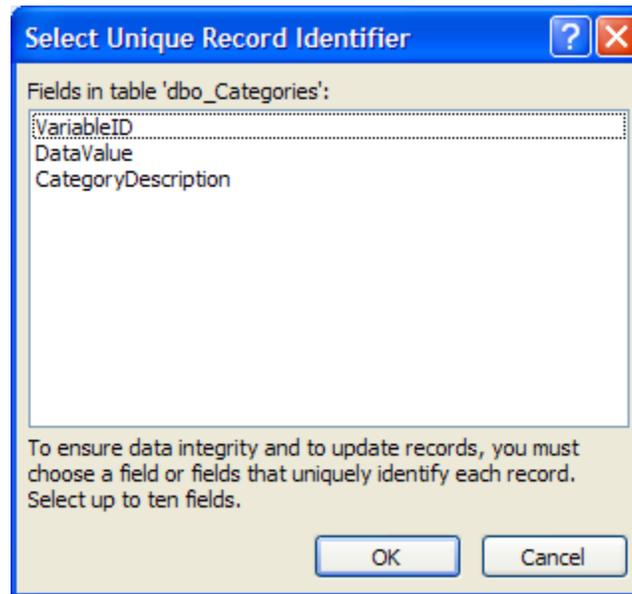
11. Select all tables with prefix **dbo**.

Figure 52: Select tables with prefix "dbo."



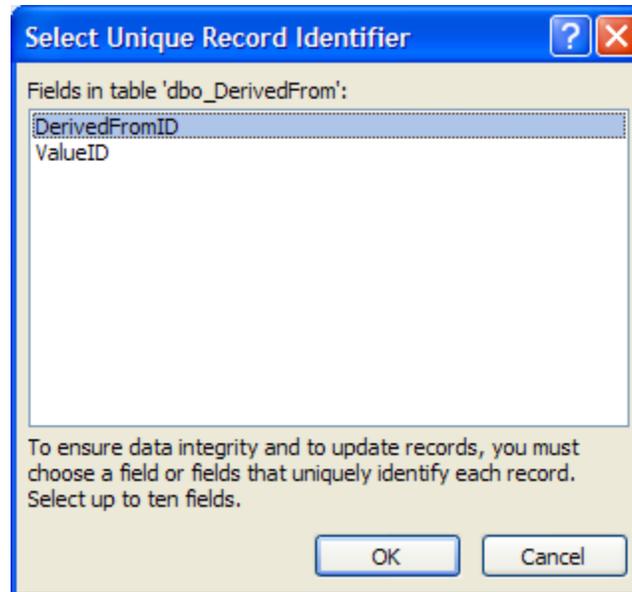
12. You will then be prompted to select a unique record identifier. MS Access uses this information to create relationships such as primary and foreign keys.
13. For the **dbo_categories** select **CategoryDescription** as the **unique record identifier**. If it says unable to create index, just **click OK**.

Figure 53: Choose CategoryDescription as the Unique Record Identifier for dbo_Categories



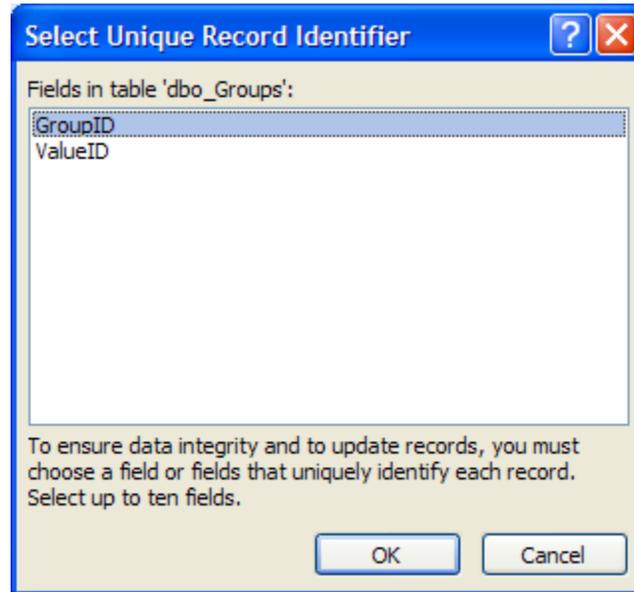
14. For the dbo_DerivedFrom select **DerivedFromID** as the unique record identifier and **click OK**

Figure 54: Choose the DerivedFromID as the unique record identifier



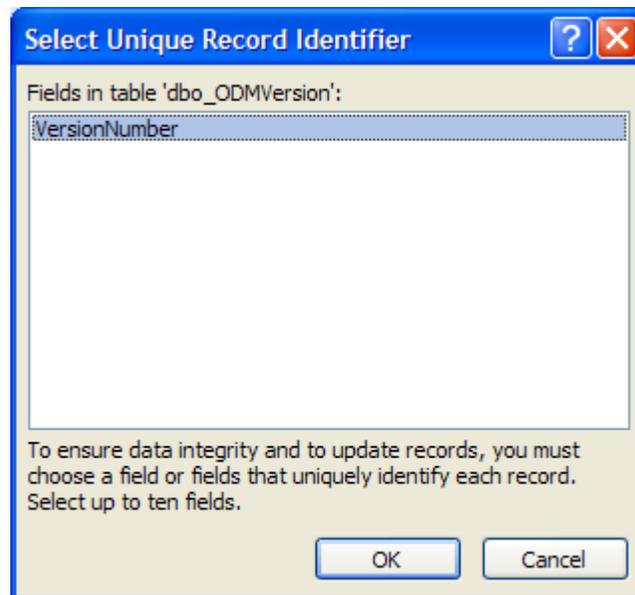
15. For the dbo_Groups select **GroupID** as the unique record identifier and **click OK**.

Figure 55: Choose GroupID as the unique record identifier



16. For the `dbo_ODMVersion` select `VersionNumber` and click **OK**.

Figure 56 : Choose VersionNumber as the unique record identifier



This will add all the tables to the database in MS Access and you will be able to see all the tables added to the blank database in MS Access.

- Now you can double click on the DataValues table on the object pane in the left hand side and you should be able to see all the values imported from the SQL Server database into MS Access.

Figure 57: Table of the DataValues

ValueID	DataValue	ValueAccuracy	LocalDateTime	UTCOffset	DateTimeUTC	SiteID	Var
1	0	0	6/22/1994 4:00:00 PM	-6	6/22/1994 10:00:00 PM	133	
2	0	0	6/22/1994 5:00:00 PM	-6	6/22/1994 11:00:00 PM	133	
3	0	0	6/23/1994 8:00:00 PM	-6	6/24/1994 2:00:00 AM	133	
4	0	0	7/2/1993 2:00:00 AM	-6	7/2/1993 8:00:00 AM	225	
5	0	0	7/2/1993 3:00:00 AM	-6	7/2/1993 9:00:00 AM	225	
6	0	0	6/30/1993 8:00:00 PM	-6	7/1/1993 2:00:00 AM	225	
7	0	0	7/1/1993 2:00:00 AM	-6	7/1/1993 8:00:00 AM	225	
8	0	0	7/1/1993 3:00:00 AM	-6	7/1/1993 9:00:00 AM	225	
9	0	0	7/1/1993 1:01:00 AM	-6	7/1/1993 7:01:00 AM	225	
10	0	0	7/1/1993 1:00:00 AM	-6	7/1/1993 7:00:00 AM	225	
11	0	0	6/30/1993 9:00:00 PM	-6	7/1/1993 3:00:00 AM	225	
12	0	0	6/30/1993 11:00:00 PM	-6	7/1/1993 5:00:00 AM	225	
13	0	0	7/1/1993 4:08:00 AM	-6	7/1/1993 10:08:00 AM	225	
14	0	0	6/30/1993 10:00:00 PM	-6	7/1/1993 4:00:00 AM	225	
15	0	0	7/2/1993 4:05:00 AM	-6	7/2/1993 10:05:00 AM	225	

- Save the changes to the database and you are all set to work with the database in MS Access.

8 IMPORTING ODM DATA INTO ARC GIS

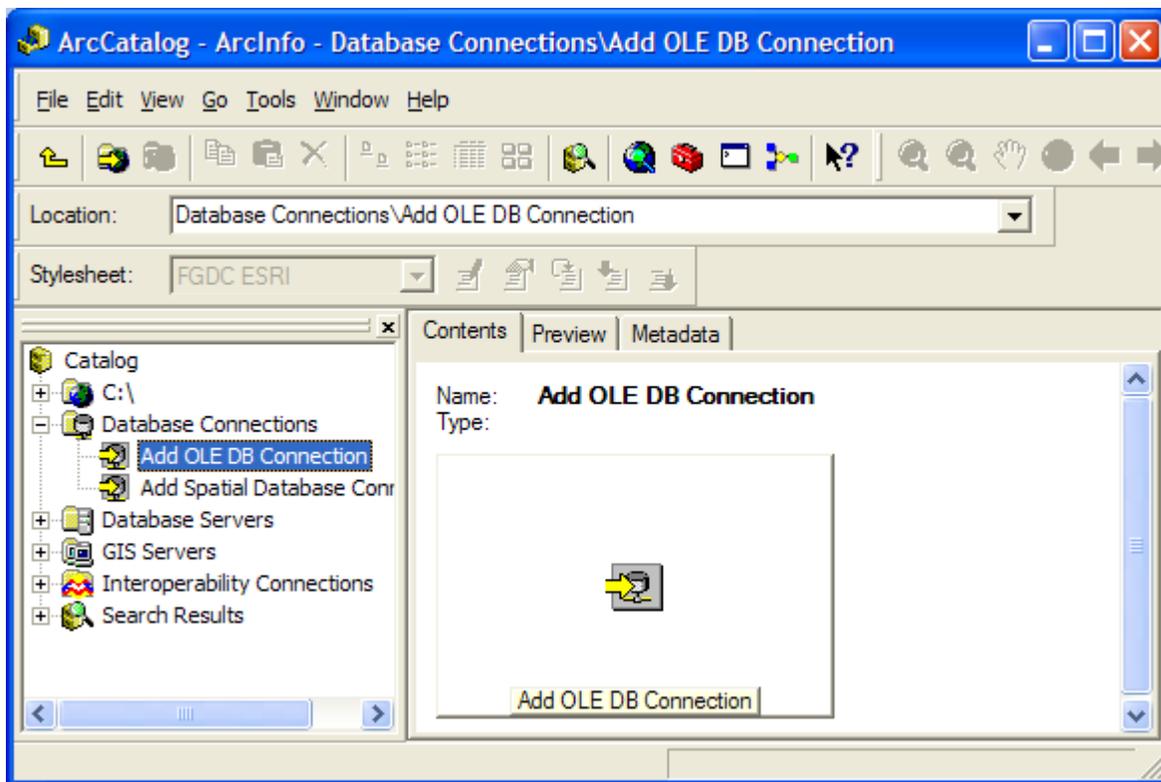
This section illustrates how we can connect to SQL Server 2005 database from ArcGIS. In order to connect to SQL Server 2005 database we would use the data source administrator that we had set up before using MS Access to connect to SQL Server 2005. I will assume that you had already set up the database administrator data link.

ArcGIS is one of the most widely used GIS software packages. It would be great if we could connect ArcGIS and SQL Server together. This section details how to do that.

8.1 CREATING A DATABASE CONNECTIONS

1. Open Arc Catalog from **Windows Start->All Programs->Arc GIS -> Arc Catalog**.
2. Go to **Database Connections in the Object explorer** view of the Arc Catalog and **double click on the Add OLE DB Connections**.

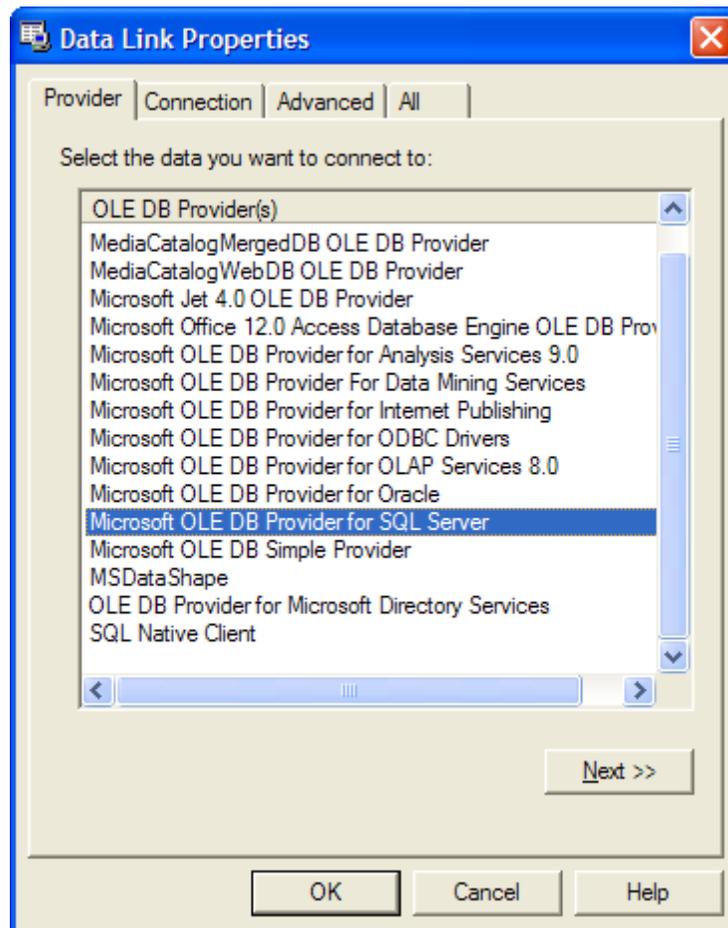
Figure 58 : Select database connections in Arc Catalog



3. A Data Link Properties dialog will appear asking instructions to select the provider.

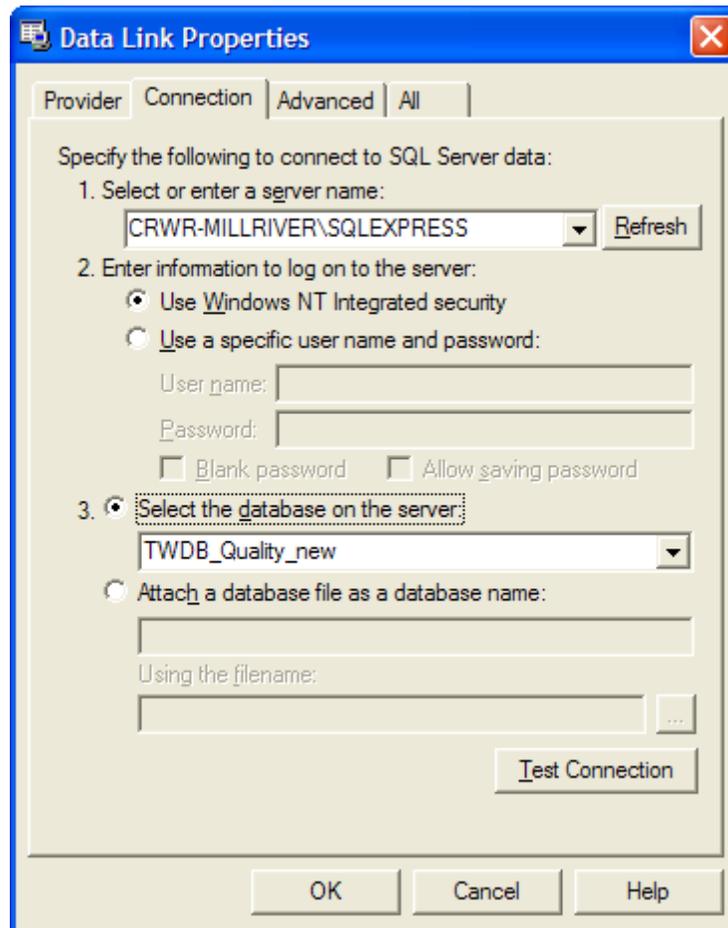
4. Select “Microsoft OLE DB Provider for SQL Server” and hit Next.

Figure 59: Data Link Properties dialog



5. **Type the server name.** The server name will be the same we used for MS Access. You can refer to the Troubleshooting section on how to find the server name. I used the server name “CRWR-MILLRIVER\SQLEXPRESS”.
6. **Check the box for Windows NT Integrated Security.**
7. **Select the database** on the server you want to connect. Click on the drop down menu and you will be able to see all the databases listed in the server. We will select TWDB_Quality_new for this tutorial.

Figure 60 : Select the Data Link source for SQL Server



8. Click Test Connection

Figure 61: Test Connection Successful

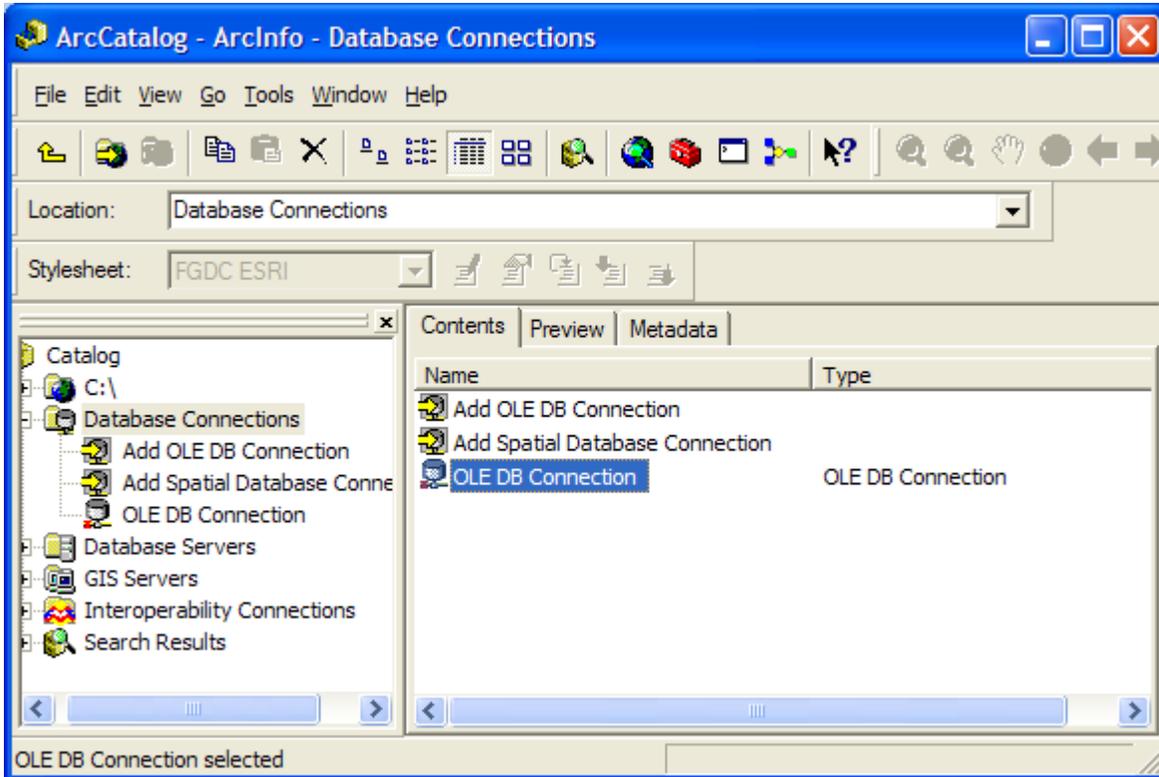


9. Once you have succeeded you can click ok. We have added the SQL Server connection successfully and we will now import the database from SQL Server 2005 into ArcGIS.

8.2 IMPORTING THE DATABASE INTO ARC GIS

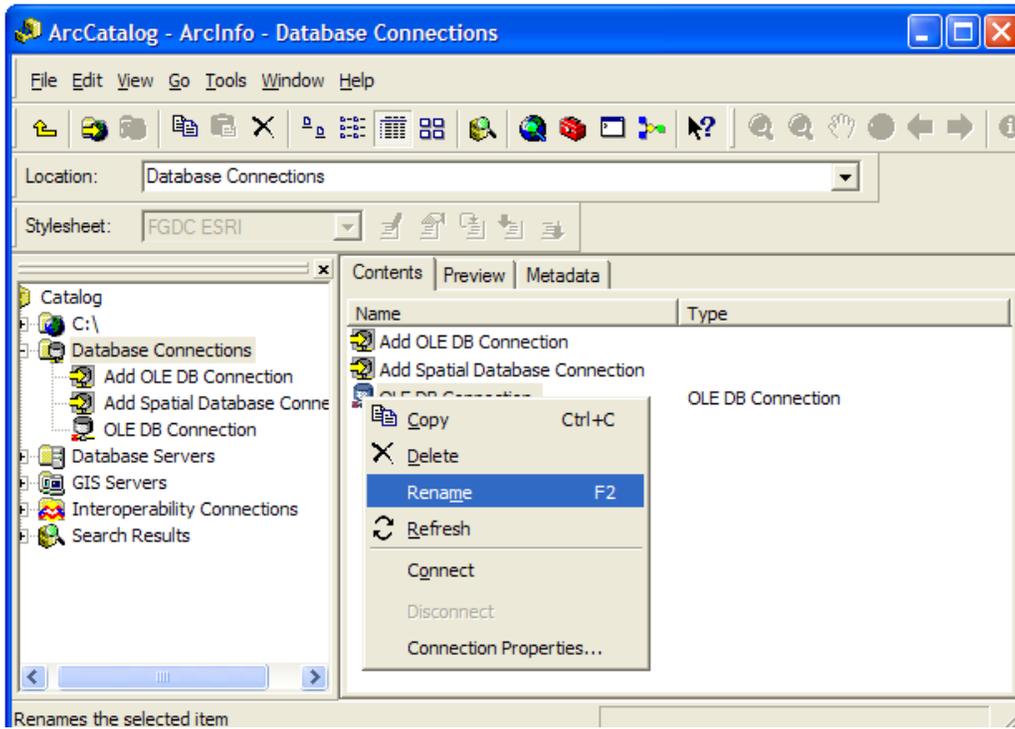
1. Get back to Arc Catalog

Figure 62: Arc Catalog has a new OLE DB Connection added



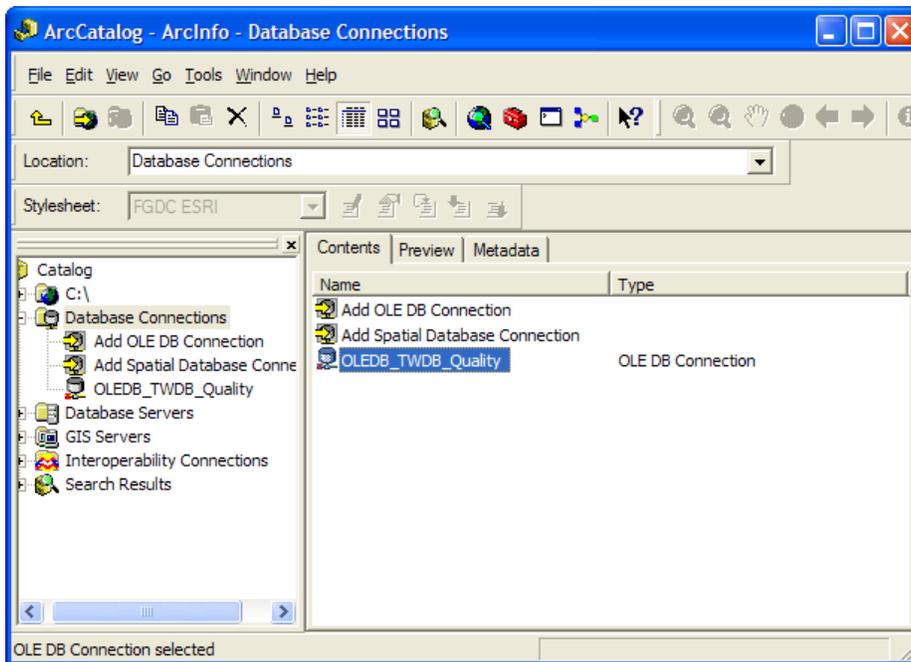
2. Right click on the new connection **OLE DB Connection** and select **Rename**.

Figure 63: Rename the OLE DB Connection



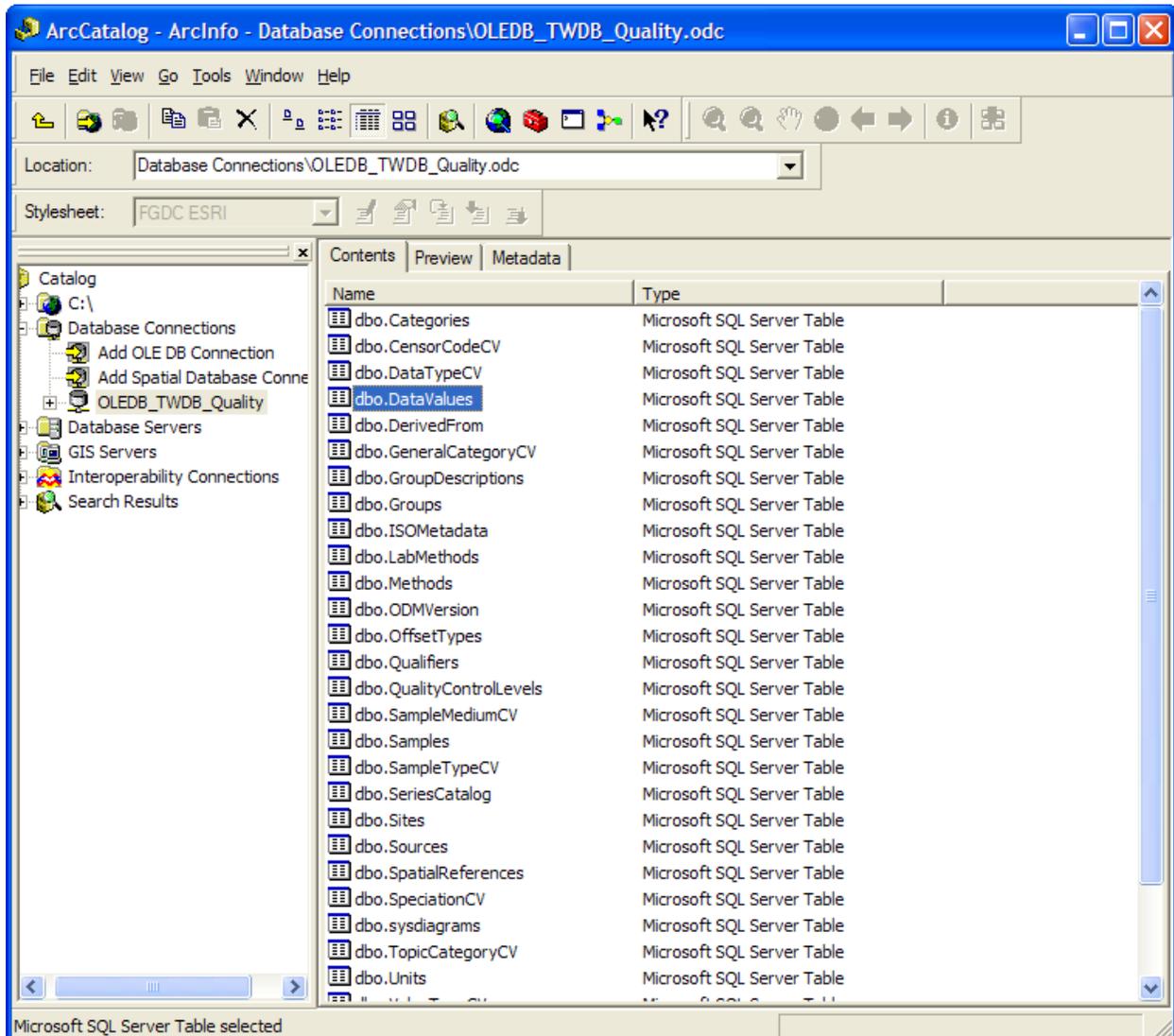
3. Rename it as **OLEDB_TWDB_Quality**.

Figure 64: Rename the OLE DB Connection to OLEDB_TWDB_Quality



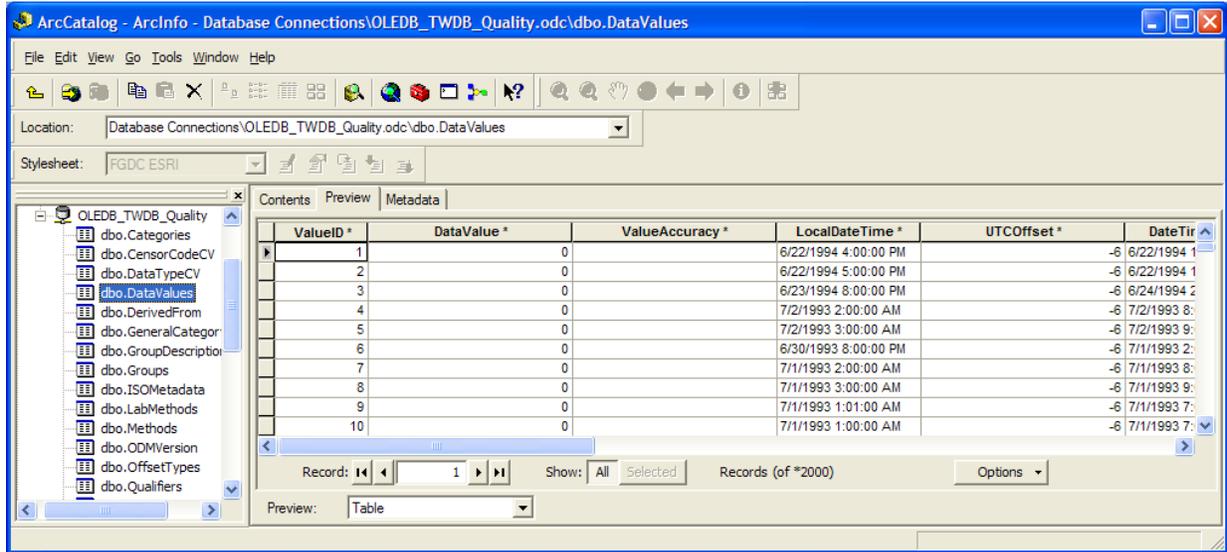
4. Then **right click** on the **OLEDB_TWDB_Quality** and **click connect**. You will be able to see all the tables in TWDB_Quality database.

Figure 65 : DataValues table in Arc Catalog



5. **Click on the DataValues** table in the Object Explorer tab on the right hand side of the Arc Catalog window.
6. **Click on the preview tab** and you will be able to see all the contents of the table displayed. It might take a little time to load the contents.

Figure 66: Click on the Preview tab to display all the records in DataValues Table



We have now established a connection with the SQL server database table in Arc GIS and we are ready to use these tables as a source in our Arc Map documents.

9 CONCLUSION

The document serves as a helpful guide for users who are new to SQL Server databases and how they can import and work with the SQL Server database in applications like ODM Tools, MS Excel, MS Access, and Arc GIS. Learning to import database files in various tools provides us with an edge to use tools with which we are already comfortable. This also means that we do not have to learn SQL Server 2005 to use the ODM Database files provided on the EFIS home page.

10 TROUBLESHOOTING

10.1 HOW TO SET UP THE SA ACCOUNT FOR SQL SERVER 2005

This step-by-step article discusses the steps you can use to change the SQL Server **Sa** (system administrator) password.

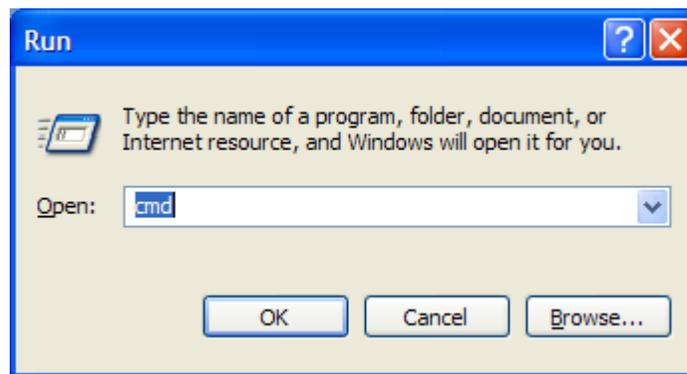
You can configure Microsoft SQL Server 2005 Express, Microsoft SQL Server Desktop Engine (MSDE) versions 2000, or earlier versions of Microsoft SQL Server to run in Mixed Authentication mode. The **Sa** account is created during

the installation process and the **Sa** account has full rights in the SQL Server environment. By default, the **Sa** password is blank (NULL), unless you change the password when you run the MSDE Setup program. To conform to the best security practices, you must change the **Sa** password to a strong password at the first opportunity.

10.1.1 HOW TO CREATE A SA PASSWORD FOR SQL SERVER ON YOUR MACHINE

1. On the computer that is hosting the instance of MSDE to which you are connecting, open a command prompt window. **Windows->Start->Run**

Figure 67: The command prompt



2. At the command prompt, type the following command, and then press **ENTER**:

```
osql -U sa
```

This connects you to the local, default instance of MSDE by using the **sa** account. To connect to a named instance installed on your computer type:

```
osql -U sa -S servername\instancename  
#For my local system I Used  
osql -U sa -S crwr-millriver\sqlexpress
```

You are now at the following prompt:

```
Password:
```

3. **Press ENTER** again. This will pass a NULL (blank) password for **Sa**.

If you see the following prompt after you press ENTER, then you do not have a password for the **sa** account:

1>

We recommend that you create a non-NULL, strong password to conform with security practices.

4. **Please enter a password and exit.**
5. You can then login into ODM Tools and check if your password is working.

However, if you receive the error message, you have entered an incorrect password. This error message indicates that a password has been created for the **Sa** account.

I would suggest you refer to the Microsoft support site where a brief explanation has been given about this error and you will also find more troubleshooting methods to resolve the error. You can visit the site <http://support.microsoft.com/kb/322336> to find more about this error.

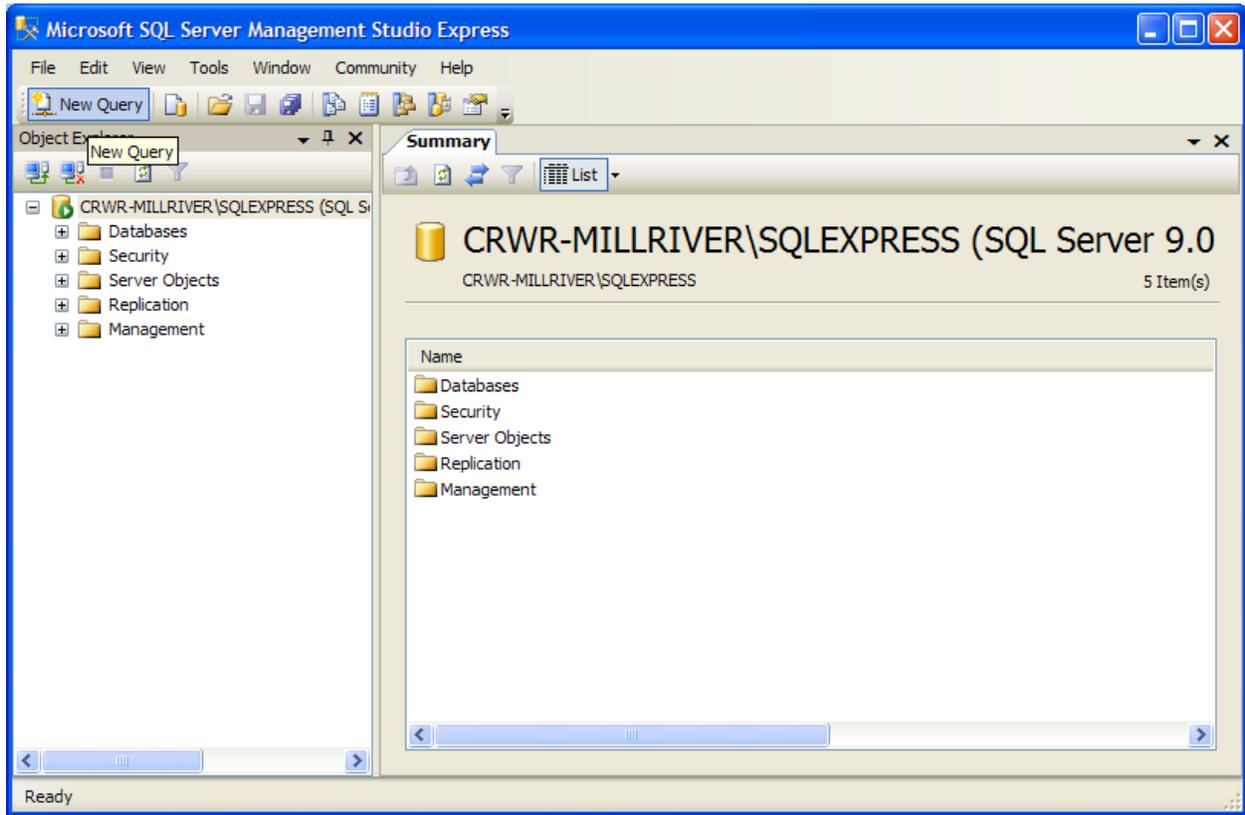
10.2 HOW TO FIND THE NAME OF THE SQL SERVER 2005 INSTALLED ON YOUR MACHINE

SQL Server Name is the name that is associated with the server on your local machine. The server name is very important to identify since this name is required in setting up local database connections.

10.2.1 HOW TO FIND OUT THE SQL SERVER NAME ON YOUR SYSTEM

1. Go to **Windows->Start->All Programs->Microsoft SQL Server 2005->SQL Server Management Studio Express**
2. Log into the SQL Server Management Studio Express using Windows Authentication.
3. **Click** on the **New Query** Button. A query window opens up for you to type in the queries.

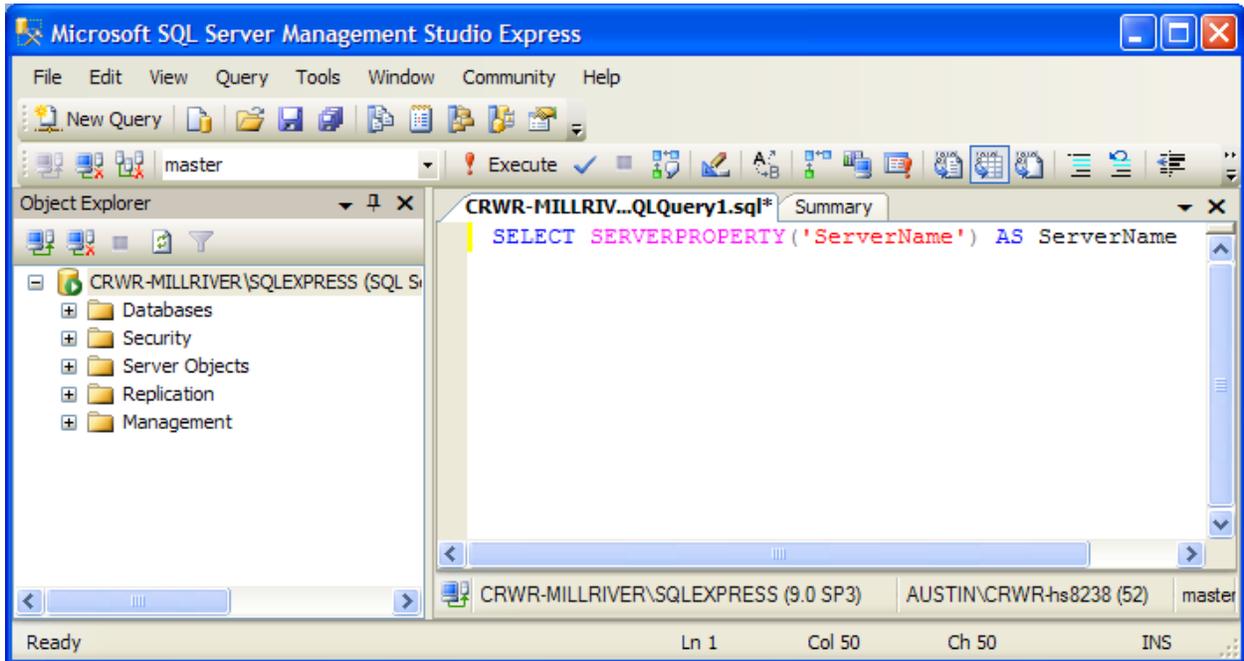
Figure 68: Click on the New Query Button



4. You can use the below Query in SQL Express to find out your Server Name. This query will give you the SQL Server Name on your system.

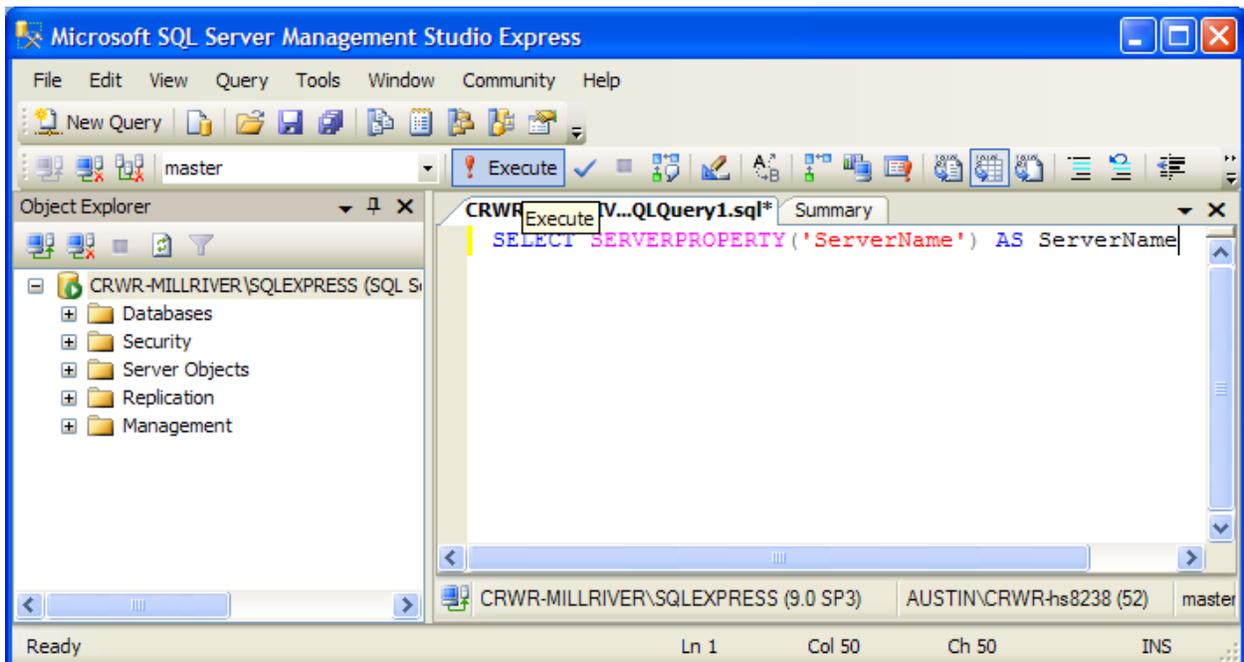
```
SELECT SERVERPROPERTY('ServerName') AS ServerName
```

Figure 69: Type the Query



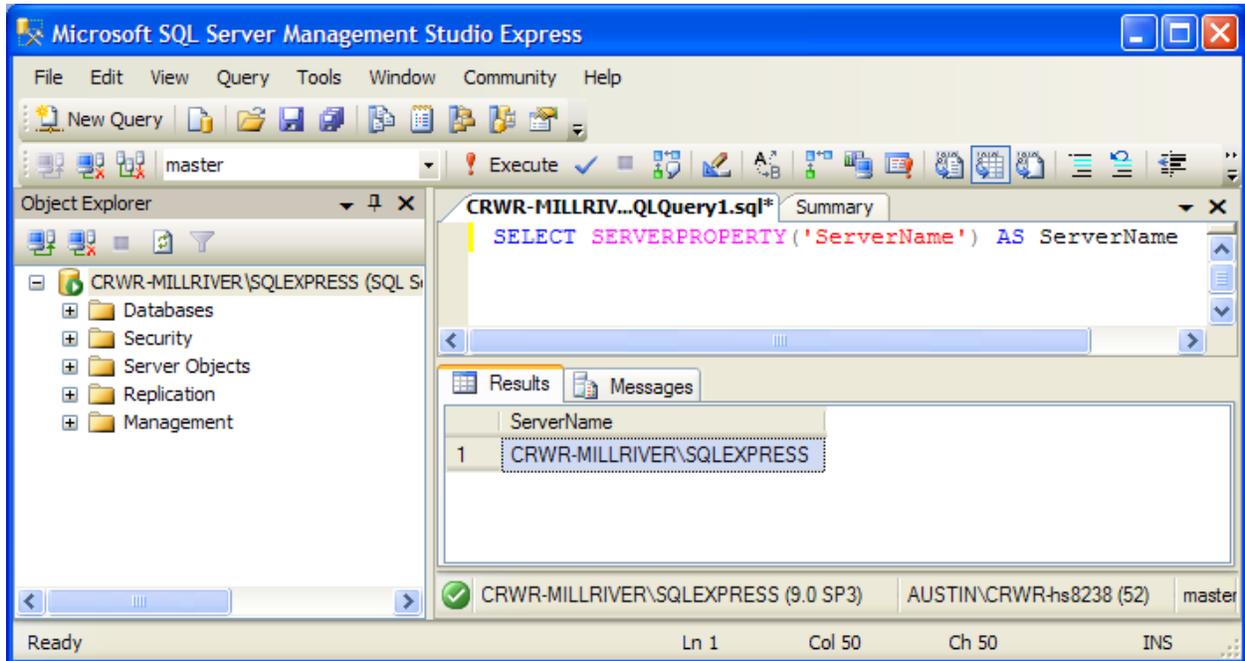
5. After typing the Query in the Query window, you have to **hit Execute** Button in the tollbar just above the query window.

Figure 70: Hit the Execute Button



6. On hitting the Execute button SQL server will execute the SQL query and will return you the SQL Server name that is present on your system.

Figure 71: The Server Name is returned



7. You will find that the **server name is also displayed in the task bar at the bottom**
If you want to quickly find out the server name you can look up at the bottom on the task bar.
8. You now have the SQL Server Name that is configured for your system. Use this name for configuring the ODBC Administrator set up.