AutoCAD Map 3D – Joining Excel Data

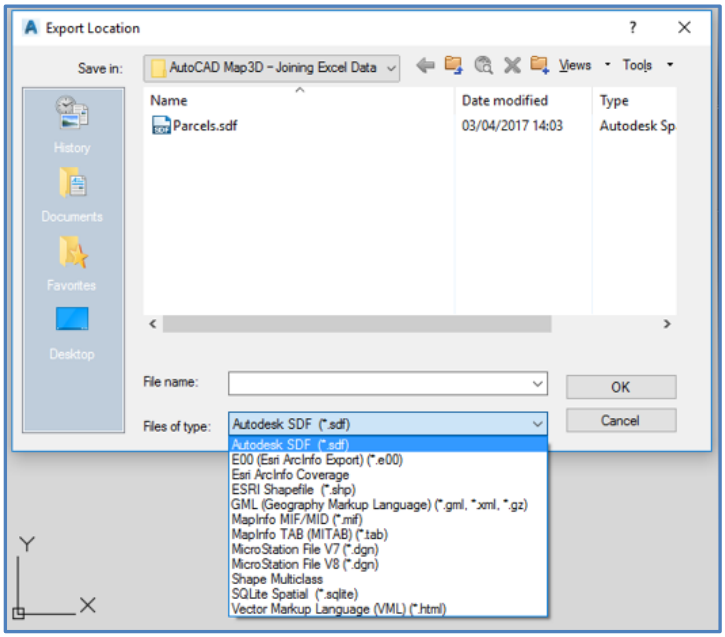
One of the main differences between using CAD and GIS is that CAD is very much interested in the linework of features, whereas GIS users are just as interested (if not more interested) in the **attributes** of those geographical features.

Using the **Properties** pane within CAD you can interrogate features and set styles based on those attributes. However, without having those attributes in a **Table** view, it's hard to implement spatial analysis, attribute querying and thematic maps, all of which are commonplace within a desktop GIS.

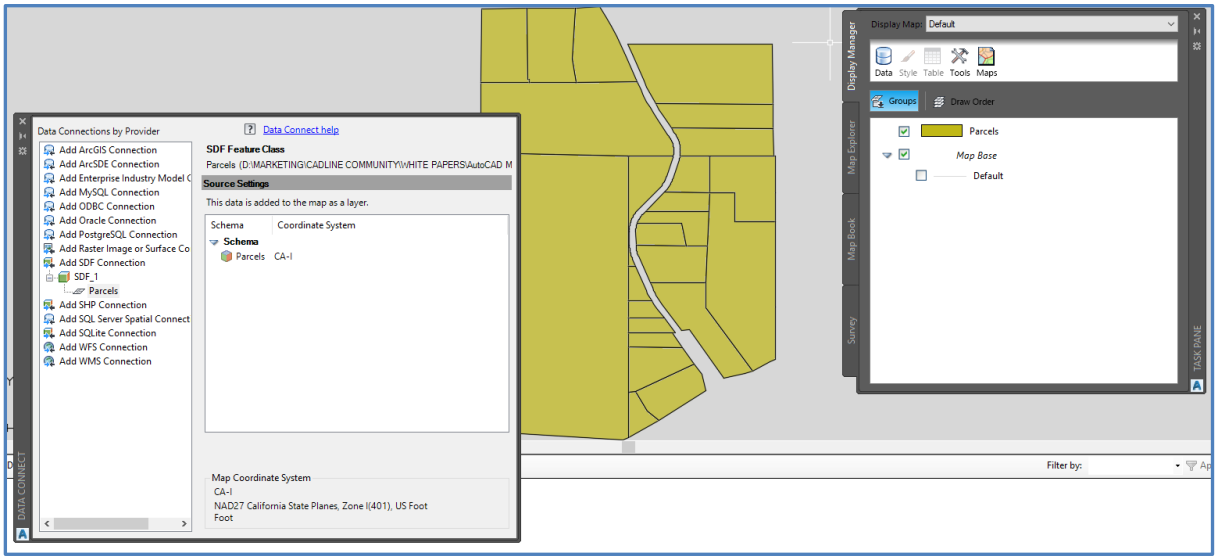
Autodesk's Map 3D application is a blend of CAD drawing tools with high end spatial analytics, which makes it the perfect tool for CAD users who need to manage spatial datasets. However, when I visit many clients and run Map 3D training courses, it's obvious to me that many Map 3D users are not currently exploring these capabilities, often because the data is being loaded as linework within the Drawing.

This paper is based on a training course I delivered recently where I showed the delegates how to join external attribute data (stored in Excel) to geographic features within Map 3D. Firstly, if your geographic objects are stored as linework in a Drawing Layer you can use this White Paper in our Cadline Community forum to learn how to use the **MapExport** tool to export the data to a GIS file, e.g. an SDF or SHP file.

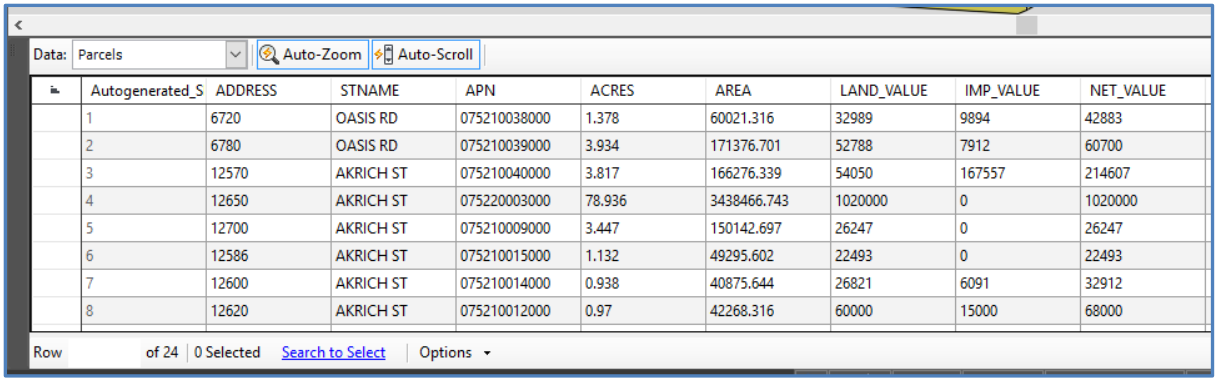
https://www.cadlinecommunity.co.uk/hc/en-us/articles/202477232-AutoCAD-Map-3D-Convert-DWG-to-SDF



Once the DWG Layer has been exported to either a SDF or SHP file, you can use the **Data Connection** tool within the Task Pane to connect to and then open the new GIS file. In this example, I have opened a SDF file which contains Land **Parcel** polygons.



Using the **Table** option within the Task Pane > **Display Manager** you can view the attributes for each object. If the features were exported from a DWG Layer initially there will be **no attributes** associated to each feature. In this example, I am using an existing SDF layer which has some of the attributes that I need.


Data: Parcels | Auto-Zoom | Auto-Scroll

	Autogenerated_S	ADDRESS	STNAME	APN	ACRES	AREA	LAND_VALUE	IMP_VALUE	NET_VALUE
	1	6720	OASIS RD	075210038000	1.378	60021.316	32989	9894	42883
	2	6780	OASIS RD	075210039000	3.934	171376.701	52788	7912	60700
	3	12570	AKRICH ST	075210040000	3.817	166276.339	54050	167557	214607
	4	12650	AKRICH ST	075220003000	78.936	3438466.743	1020000	0	1020000
	5	12700	AKRICH ST	075210009000	3.447	150142.697	26247	0	26247
	6	12586	AKRICH ST	075210015000	1.132	49295.602	22493	0	22493
	7	12600	AKRICH ST	075210014000	0.938	40875.644	26821	6091	32912
	8	12620	AKRICH ST	075210012000	0.97	42268.316	60000	15000	68000

Row | of 24 | 0 Selected | Search to Select | Options

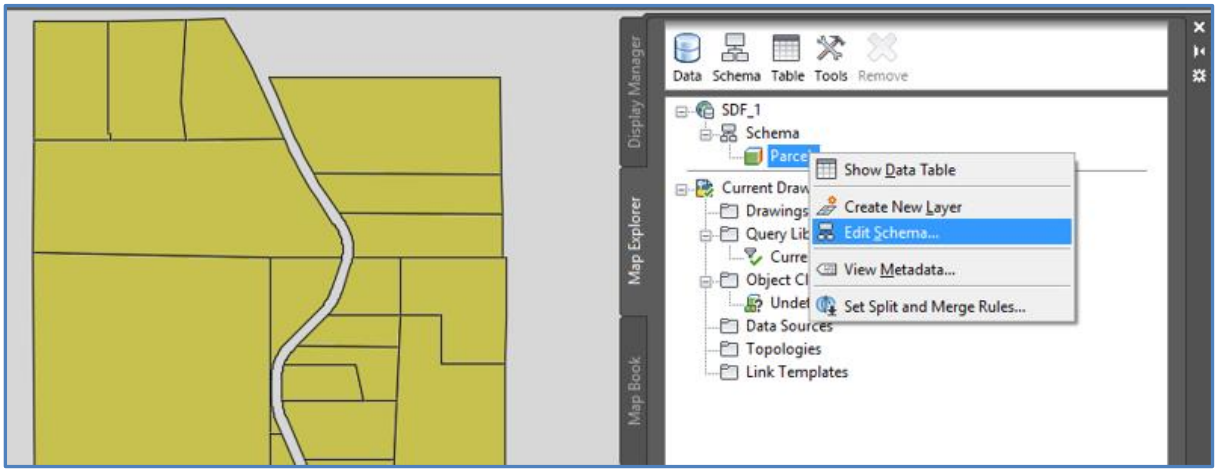
However, I also have an external **Excel file** which has the additional attributes that I would like to attach to each of these records. If we view this external data the additional field is the Parcels **Land Type**, e.g. Grass, Concrete or Sand.

J25 CONCRETE

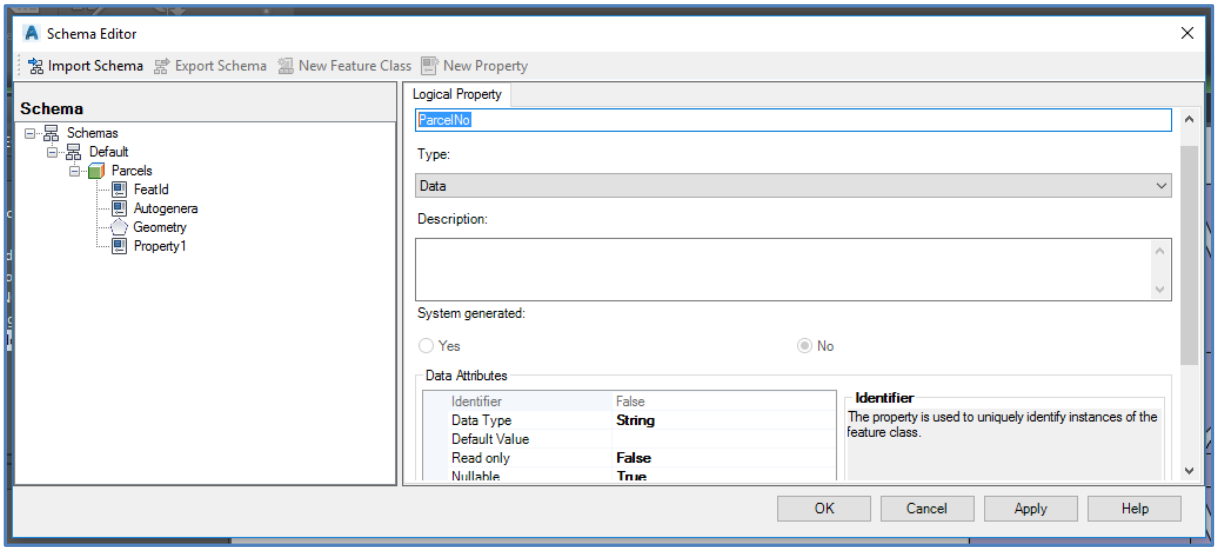
	A	B	C	D	E	F	G	H	I	J
1	ID	Address	STNAME	APN	ACRES	AREA	LAND_VALUE	IMP_VALUE	NET_VALUE	LAND_TYPE
2	1	6720	OASIS RD	75210038000	1.378	60021.316	32989	9894	42883	GRASS
3	2	6780	OASIS RD	75210039000	3.934	171376.701	52788	7912	60700	CONCRETE
4	3	12570	AKRICH ST	75210040000	3.817	166276.339	54050	167557	214607	SAND
5	4	12650	AKRICH ST	75220003000	78.936	3438466.743	1020000	0	1020000	GRASS
6	5	12700	AKRICH ST	75210009000	3.447	150142.697	26247	0	26247	SAND
7	6	12586	AKRICH ST	75210015000	1.132	49295.602	22493	0	22493	CONCRETE
8	7	12600	AKRICH ST	75210014000	0.938	40875.644	26821	6091	32912	GRASS
9	8	12620	AKRICH ST	75210012000	0.97	42268.316	60000	15000	68000	CONCRETE
10	9	12578	AKRICH ST	75210036000	1.345	58609.44	27565	110263	130828	CONCRETE
11	10	12750	AKRICH ST	75230002000	24.342	1060319.5	155856	98613	247469	GRASS

In order to undertake the Join between the Excel data and the SDF file, we will need to have a value which will act as the **unique ID** between each record. In this case, we will use the **ID** field in Excel and the **Autogenerated Number** field in my original SDF file. However, if you have exported your features from a DWG Layer, you may need to create the ID field and populate that with the correct values.

To add new fields into your SDF layer, from the Task Pane > **Map Explorer** > find the SDF file > right click and choose **Edit Schema**.

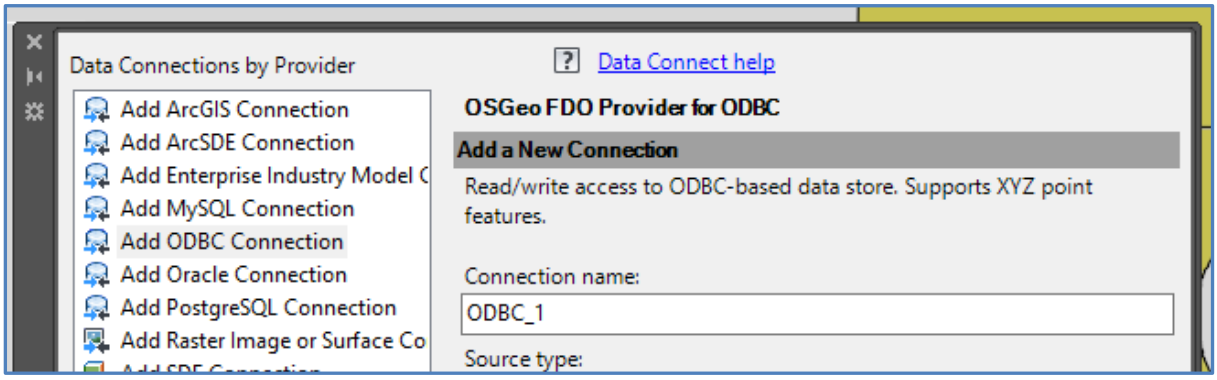


In the **Schema Editor**, choose your SDF Layer and then you can add a **New Property** (field). Give the new field a name, in this example you could call it ParcelNo and define the type field, for example will this be a textual (String) or numeric field. Having added the new field press **OK** to apply and save the changes.

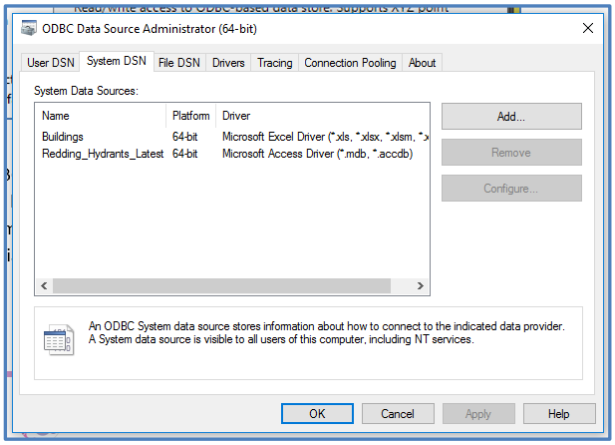


The Data Table for the SDF will now contain this new field.

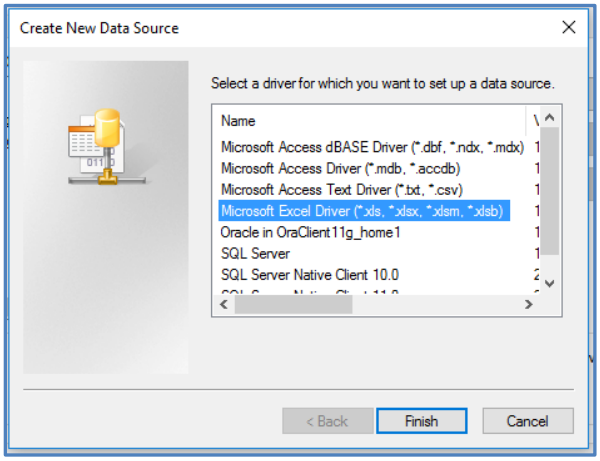
Now that we have a Join field between the SDF and the Excel file, we can import the Excel data and undertake the Join to add our additional Land_Type field. Excel data can be loaded into Map 3D using several tools, but to ensure that the Excel data is available for our Join we will load it via the **Data Connections** tool. The **ODBC Connection** allows you to connect Map 3D to external attribute data stored in CSV, XLS and some databases e.g. MS Access.



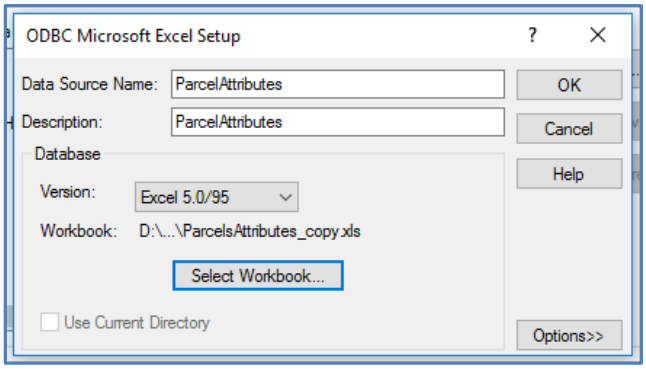
In order to utilise the ODBC Connection option you will first need to setup a **Data Source Name** (DSN) which defines how Map 3D will connect to your data. DSN's are generated using the ODBC tools on your computer and will depend on whether your applications are 32bit or 64-bit. On my PC my applications are 64-bit so I have opened the **64-bit ODBC Data Sources** tool.



So that other users on my PC can access the connection I will **Add** a **System DSN.** In the **Create New Data Source** window, select from the Create Drivers list and choose the type to be **Microsoft Excel Driver.**



Finally, in the **ODBC Excel Setup**, provide a **DSN Name** and **Description**, choose the **XLS Version** and Select (find) the XLS that you wish to join to.

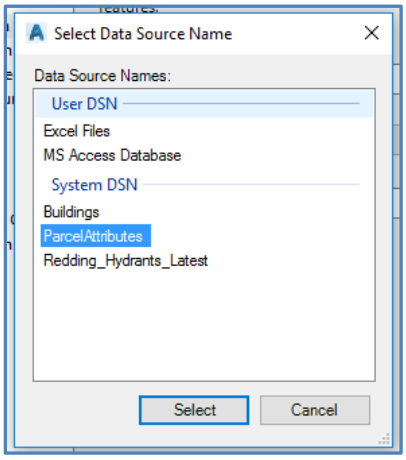


So that Map 3D knows which Worksheet and which records to open when you connect, you will need to ensure that in your XLS you have defined an **area of interest**. To do this, simply open the XLS, **highlight the rows and columns** that you wish to import and provide a suitable name in the top left **'Name Box'**. In my example I have named the selected area as 'Parcels'.

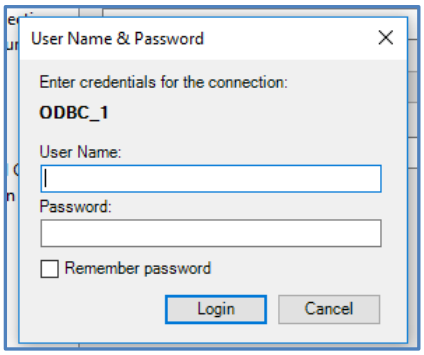
Parcels | CONCRETE

	A	B	C	D	E	F	G	H	I	J	K	L
1	ID	Address	STNAME	APN	ACRES	AREA	LAND_VALUE	IMP_VALUE	NET_VALUE	LAND_TYPE		
2	1	6720	OASIS RD	75210038000	1.378	60021.316	32989	9894	42883	GRASS		
3	2	6780	OASIS RD	75210039000	3.934	171376.701	52788	7912	60700	CONCRETE		
4	3	12570	AKRICH ST	75210040000	3.817	166276.339	54050	167557	214607	SAND		
5	4	12650	AKRICH ST	75220003000	78.936	3438466.743	1020000	0	1020000	GRASS		
6	5	12700	AKRICH ST	75210009000	3.447	150142.697	26247	0	26247	SAND		
7	6	12586	AKRICH ST	75210015000	1.132	49295.602	22493	0	22493	CONCRETE		
8	7	12600	AKRICH ST	75210014000	0.938	40875.644	26821	6091	32912	GRASS		
9	8	12620	AKRICH ST	75210012000	0.97	42268.316	60000	15000	68000	CONCRETE		
10	9	12578	AKRICH ST	75210036000	1.345	58609.44	27565	110263	130828	CONCRETE		
11	10	12750	AKRICH ST	75230002000	24.342	1060319.5	155856	98613	247469	GRASS		
12	11	12800	AKRICH ST	75230008000	6.549	285278.292	81600	209100	290700	CONCRETE		
13	12	12657	AKRICH ST	75210047000	2.019	87942.841	61200	244800	299000	GRASS		
14	13	12629	AKRICH ST	75210033000	4.551	198247.516	16190	34549	43739	CONCRETE		
15	14	19350	RAINTREE LN	75230010000	6.494	282890.406	43239	143075	179314	GRASS		
16	15	19360	RAINTREE LN	75230009000	6.629	288753.507	93513	270000	356513	GRASS		
17	16	12765	AKRICH ST	75230005000	15.086	657151.411	21007	63324	77331	SAND		
18	17	12707	AKRICH ST	75210020000	2.483	108144.788	38443	12626	44069	GRASS		
19	18	12685	AKRICH ST	75210031000	1.995	86918.38	8437	7380	15817	GRASS		
20	19	12554	OLD OREGON TRL	75210034000	6.935	302077.308	16976	8020	17996	SAND		
21	20	12715	AKRICH ST	75210045000	6.839	297899.618	47691	56170	96861	GRASS		
22	21	12568	OLD OREGON TRL	75210046000	17.972	782867.332	79486	5298	84784	SAND		
23	22	12725	AKRICH ST	75230007000	5.057	220303.884	33078	51898	84976	SAND		
24	23	12735	AKRICH ST	75230006000	5.04	219546.622	40262	3876	37138	GRASS		
25	24	12667	AKRICH ST	75210048000	2.545	110880.973	42840	0	42840	CONCRETE		
26												

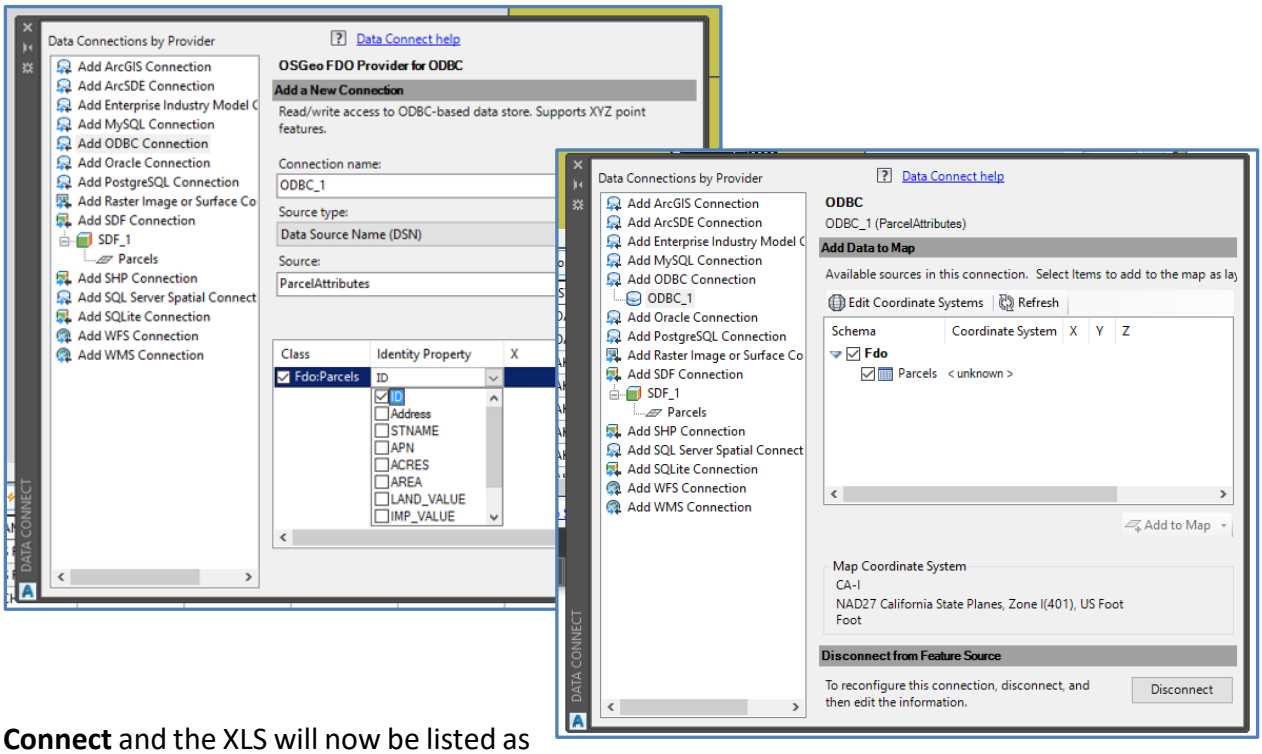
In Map 3D we can now use the Data Connection > **Add ODBC Connection**. The Source Type is DSN and when you click on the Source option the list of your computers DSN's will appear.



Having chosen our newly created DSN (ParcelAttributes) you can **Test the Connection**, where you can leave the username and password values blank.

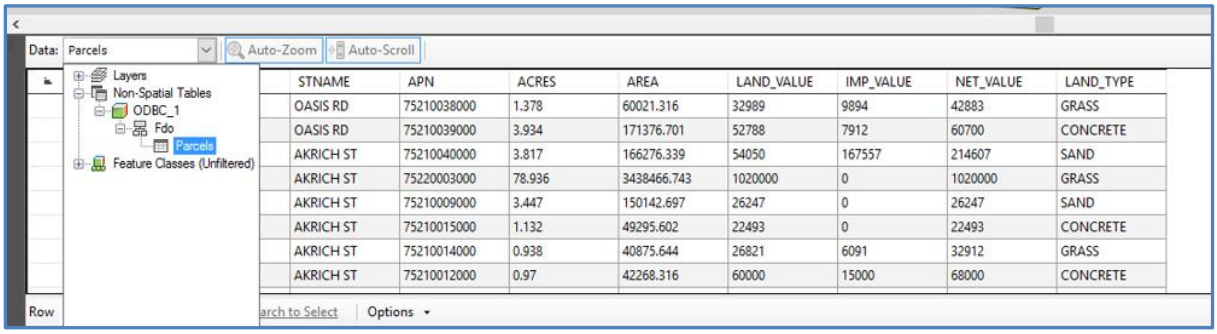


Choose **Login** and the ODBC Connection will have updated, where you can now choose the **Identity Property**, which should be a unique id. If we were importing point data and wanted to auto create points, we could also define which fields contain the **X and Y coordinates.**



Connect and the XLS will now be listed as a new connection. There is no need to add this to the map, as we only require the attributes.

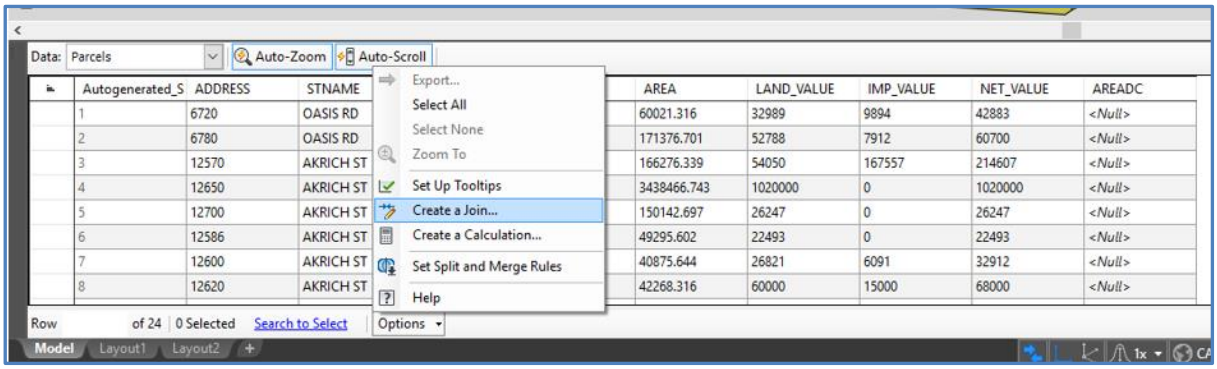
To check that the Excel file has successfully opened, we can update the **Table** view to list the records of information for the Excel file, using the **Non-Spatial Tables > ODBC** > Parcels option.



STNAME	APN	ACRES	AREA	LAND_VALUE	IMP_VALUE	NET_VALUE	LAND_TYPE
OASIS RD	75210038000	1.378	60021.316	32989	9894	42883	GRASS
OASIS RD	75210039000	3.934	171376.701	52788	7912	60700	CONCRETE
AKRICH ST	75210040000	3.817	166276.339	54050	167557	214607	SAND
AKRICH ST	75220003000	78.936	3438466.743	1020000	0	1020000	GRASS
AKRICH ST	75210009000	3.447	150142.697	26247	0	26247	SAND
AKRICH ST	75210015000	1.132	49295.602	22493	0	22493	CONCRETE
AKRICH ST	75210014000	0.938	40875.644	26821	6091	32912	GRASS
AKRICH ST	75210012000	0.97	42268.316	60000	15000	68000	CONCRETE

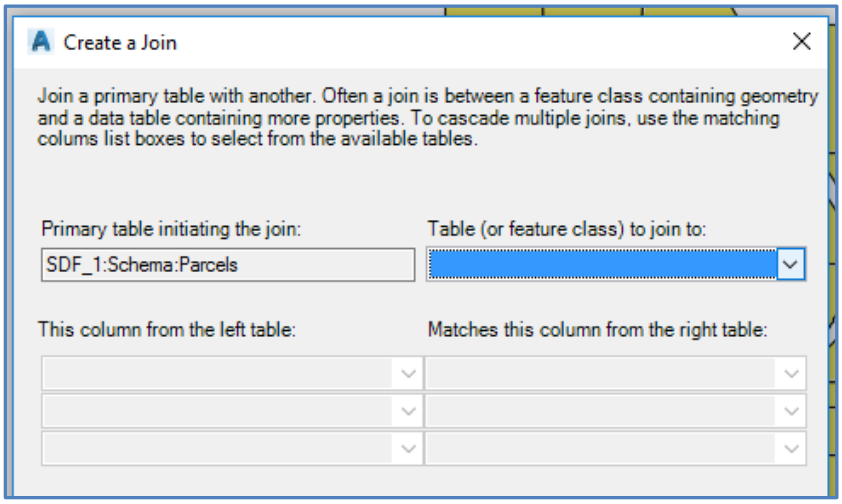
Notice that the imported Excel data has many of the same fields as the existing SDF layer, but also has an extra field on the end called **Land_Type**. We will join the Excel data to our SDF using a unique value and attach the new Land_Type data to our SDF.

In the Data Table view, ensure that you choose the **Layers > Parcels** option, then from the **Options** menu choose **Create Join**.

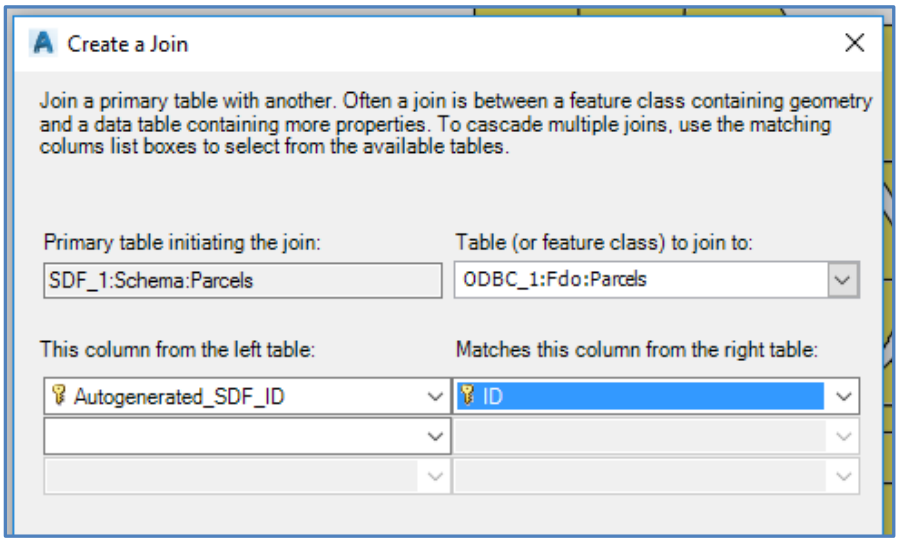


Autogenerated_S	ADDRESS	STNAME	AREA	LAND_VALUE	IMP_VALUE	NET_VALUE	AREADC
1	6720	OASIS RD	60021.316	32989	9894	42883	<Null>
2	6780	OASIS RD	171376.701	52788	7912	60700	<Null>
3	12570	AKRICH ST	166276.339	54050	167557	214607	<Null>
4	12650	AKRICH ST	3438466.743	1020000	0	1020000	<Null>
5	12700	AKRICH ST	150142.697	26247	0	26247	<Null>
6	12586	AKRICH ST	49295.602	22493	0	22493	<Null>
7	12600	AKRICH ST	40875.644	26821	6091	32912	<Null>
8	12620	AKRICH ST	42268.316	60000	15000	68000	<Null>

The **Create a Join** window allows you to define a **Primary Table** (this will be the Parcels SDF) and the **Join Table** (which will be the Excel file):



Having defined the Join Table you now have the option to choose which **fields** provide the join between the records in each file.



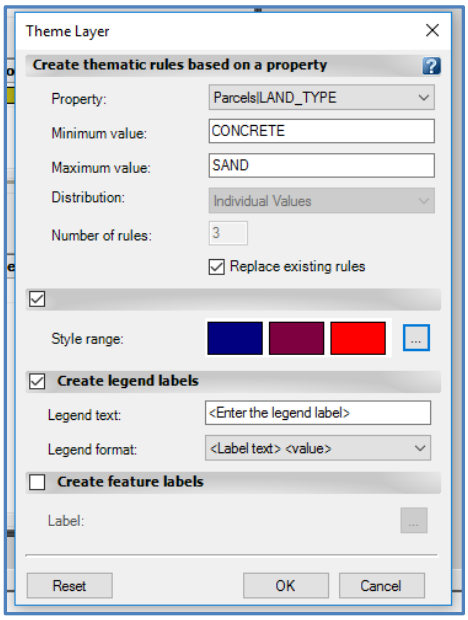
Choose the Join fields and then press **OK.**

The columns from the Excel file will now be appended to the original SDF layer, where the ID's match. Many of the fields are already within the original SDF, however the extra **Land_Type** field has now also been appended at the end.

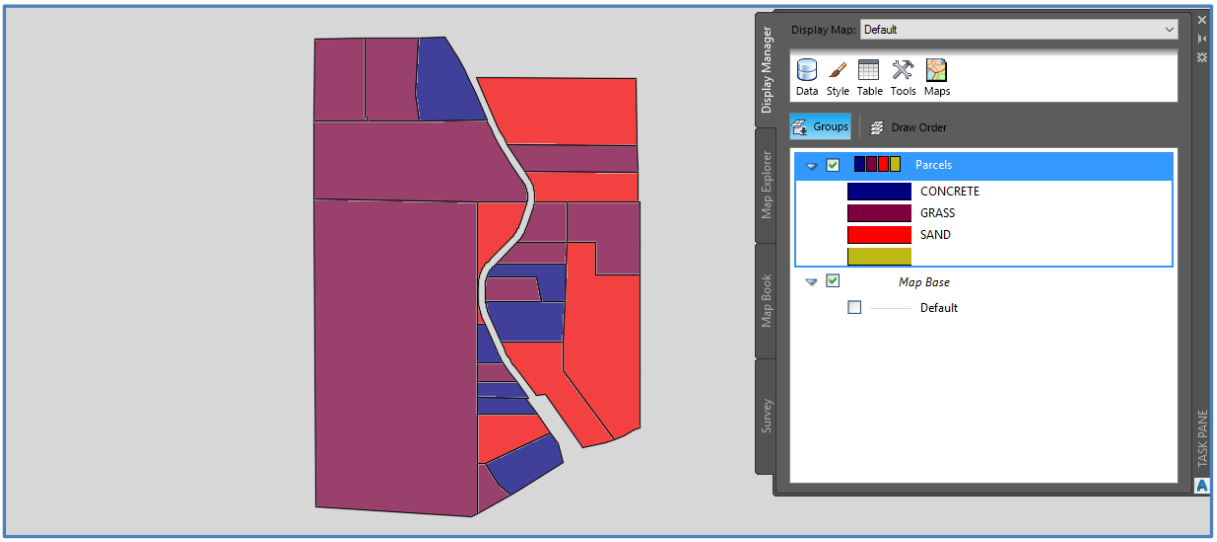
Filter by: Apply Filter

Parcels|ID	Parcels|Address	Parcels|STNAME	Parcels|APN	Parcels|ACRES	Parcels|AREA	Parcels|LAND_VA	Parcels|IMP_VALU	Parcels|NET_VALU	Parcels|LAND_T
7	12600	AKRICH ST	75210014000	0.938	40875.644	26821	6091	32912	GRASS
6	12586	AKRICH ST	75210015000	1.132	49295.602	22493	0	22493	CONCRETE
5	12700	AKRICH ST	75210009000	3.447	150142.697	26247	0	26247	SAND
4	12650	AKRICH ST	75220003000	78.936	3438466.743	1020000	0	1020000	GRASS
3	12570	AKRICH ST	75210040000	3.817	166276.339	54050	167557	214607	SAND
2	6780	OASIS RD	75210039000	3.934	171376.701	52788	7912	60700	CONCRETE
1	6720	OASIS RD	75210038000	1.378	60021.316	32989	9894	42883	GRASS

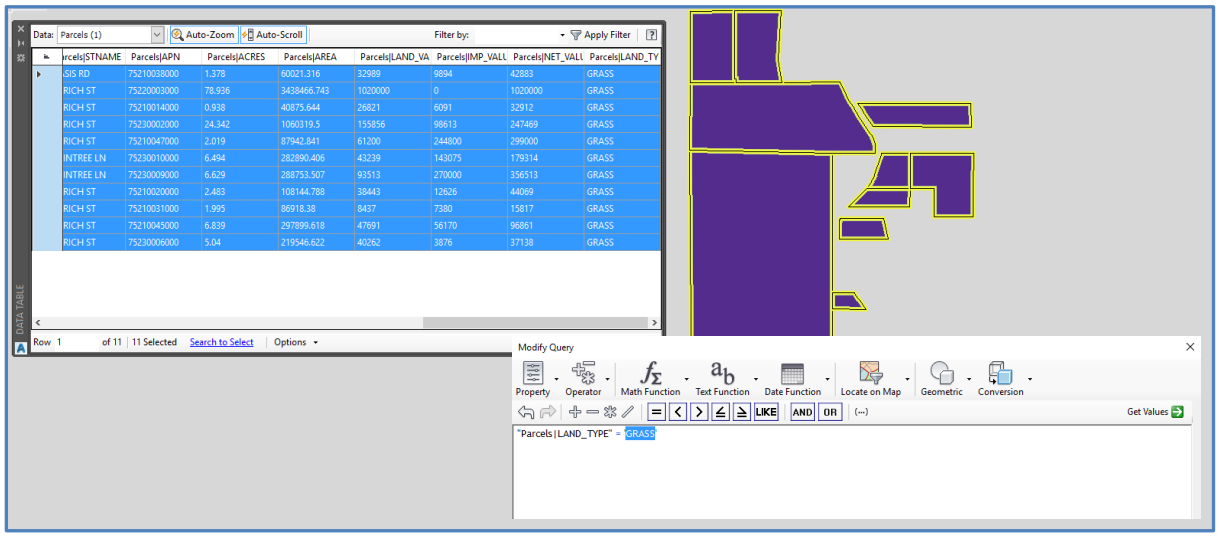
These extra fields can now be used to Style the Land Parcels with the new Land_Type values. In the Task Pane > **Display Manager** > choose **Edit Style** > **New Theme** and create a Thematic Map based on the new **Land_Type** field, choosing the colours required to represent each Land Type.



The map will now update to show the Land Parcel features styled using the new Land_Type values.



In addition, if you now save a copy of the SDF file, the newly appended fields will be saved and you can then use the new fields to perform **Attribute Queries** using the **Query to Filter Data** Tool. For example, you can query the Land Parcels to only select those where their Land_Type is 'Grass'.



Now that we are working with GIS files within Map 3D and have the options to import extra attributes, we can really start to utilise the power of the GIS functionality that Map 3D provides!