

Integrating CAD and GIS – using AutoCAD part 3

As a *'Geographer in a CAD World'* I am always searching for smarter ways to integrate CAD and GIS – **Software, Data and Processes**. Previously I have concentrated on integrating GIS with geospatial enabled CAD software such as Autodesk **InfraWorks**, Autodesk **Map3D** and Autodesk **Civils**. This has proved highly successful as these applications have **Database Connectivity** tools allowing you to connect to geospatial assets in databases, such as **SQL** and **PostGIS**. If you want to learn how to better integrate these Autodesk applications with your GIS data here is a 4-part video blog:

<https://www.cadlinecommunity.co.uk/hc/en-us/articles/360001096598-Integrated-CAD-and-GIS>

After completing these series of videos, I decided to approach CAD and GIS integration from the **'Other'** side.

How easy is it to integrate 'vanilla' Autodesk software e.g. AutoCAD with Geospatial data?

I then started on a journey of discovery. Initially this was a discovery of how this *'Geographer in a CAD World'* gets to grip with the **'Matrix'** that is vanilla AutoCAD, and then after a steep learning curve I explored ways in which AutoCAD users can successfully utilise GIS data and better integrate their work practices with their Geospatial colleagues.

In **Part 1** - I looked at ways to export CAD features as assets that could then be imported into Geospatially enabled software, such as **Autodesk Map3D** – <https://www.cadlinecommunity.co.uk/hc/en-us/articles/360001406237-QGIS-Integrating-CAD-and-GIS-Using-AutoCAD>

In **Part 2** – I explored the **ESRI ArcGIS for AutoCAD Plugin** (initial beta version) which provided geospatial basemapping options within AutoCAD - <https://www.cadlinecommunity.co.uk/hc/en-us/articles/360002202378-Integrating-CAD-and-GIS-Using-AutoCAD-Part-2>

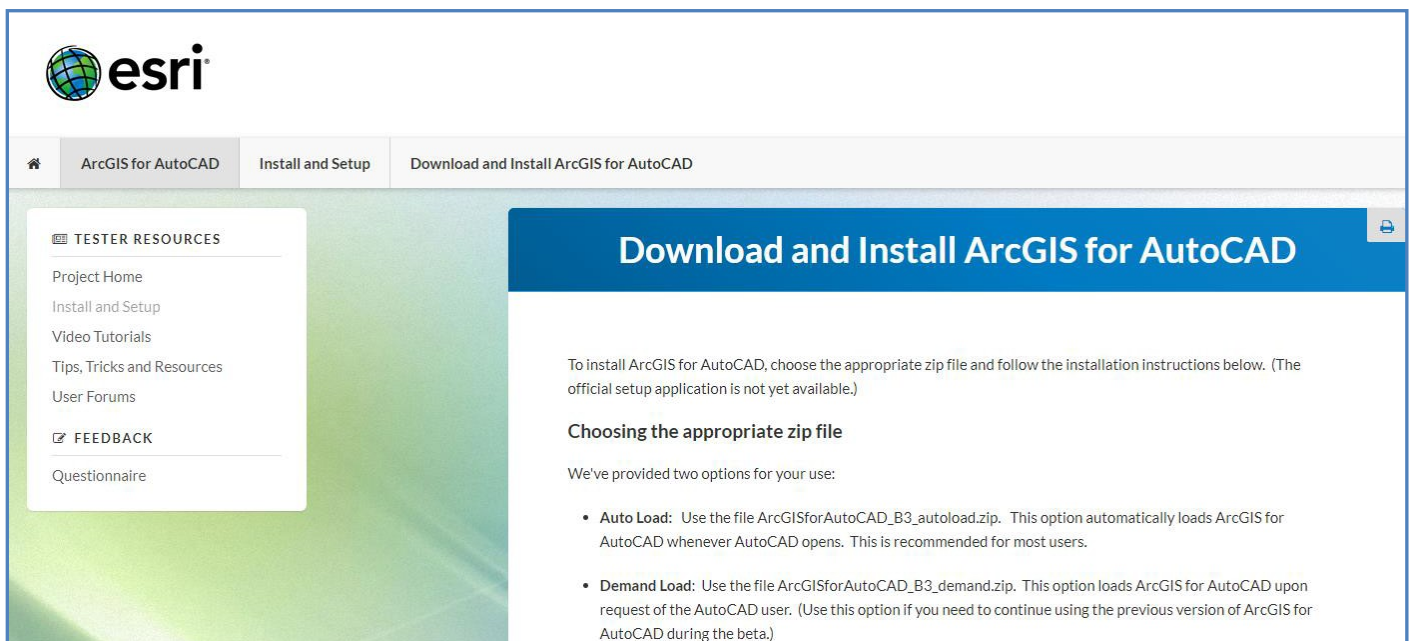
Since Part 2 (August 2019), the ESRI ArcGIS for AutoCAD Plugin has been further developed. In its most recent release – **beta 400** – you can now not only access GIS basemapping, but you can also access geospatial assets via your **ESRI ArcGIS Online** account. While this *'Geographer in a CAD World'* is a strong advocate of Open Source geospatial applications, ESRI is undoubtedly a provider of leading geospatial solutions and has a strong interest in integrating the CAD and GIS worlds.

So, in **Part 3** of this blog series we will explore the latest ArcGIS for Autodesk Plugin for AutoCAD, learn how to access geospatial assets, manage these within AutoCAD and synchronise our changes back to the data repository (ArcGIS Online) so those datasets can be shared with the wider project team.





1 - Installing the ArcGIS to AutoCAD Plugin:

Having signed up to the **Early Adopter Programme** Cadline had access to the download files for the ArcGIS for AutoCAD plugin. In August 2019, as detailed in Part 2 of this blog series, we had already installed the previous version of the ArcGIS for AutoCAD tool, so to upgrade to the latest version (**beta 400**) we simply needed to access the latest application files from our ESRI resources page.



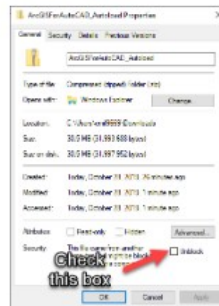
The screenshot shows the ESRI website interface. At the top left is the ESRI logo. Below it are navigation tabs: 'ArcGIS for AutoCAD', 'Install and Setup', and 'Download and Install ArcGIS for AutoCAD'. A left-hand sidebar contains a 'TESTER RESOURCES' section with links to 'Project Home', 'Install and Setup', 'Video Tutorials', 'Tips, Tricks and Resources', and 'User Forums'. Below this is a 'FEEDBACK' section with a 'Questionnaire' link. The main content area has a blue header 'Download and Install ArcGIS for AutoCAD'. Below the header, it states: 'To install ArcGIS for AutoCAD, choose the appropriate zip file and follow the installation instructions below. (The official setup application is not yet available.)' This is followed by the section 'Choosing the appropriate zip file' and the text 'We've provided two options for your use:'. Two bullet points are listed: 'Auto Load: Use the file ArcGISforAutoCAD_B3_autoload.zip. This option automatically loads ArcGIS for AutoCAD whenever AutoCAD opens. This is recommended for most users.' and 'Demand Load: Use the file ArcGISforAutoCAD_B3_demand.zip. This option loads ArcGIS for AutoCAD upon request of the AutoCAD user. (Use this option if you need to continue using the previous version of ArcGIS for AutoCAD during the beta.)'

DOWNLOADS		
File Name	Size	
 ArcGISForAutoCAD_B3_autoload.zip	31 MB	
 ArcGISForAutoCAD_B3_demand.zip	31 MB	

Having downloaded the application files, it was simply a case of following the instructions to copy over the previous install files with the latest ones provided.

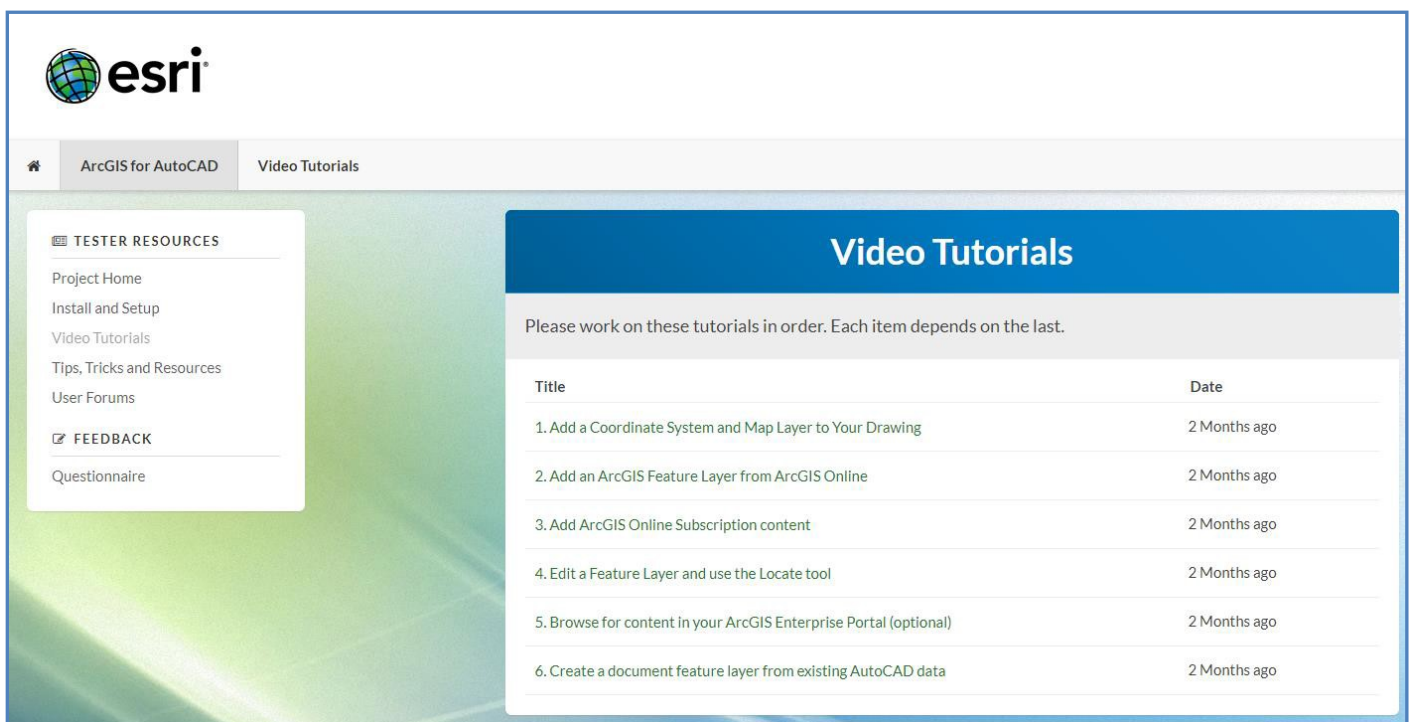
Installation Instructions

1. Download the zip file to a temporary location.
2. Unblock the zip file.



- Right click on the zip file in Windows Explorer.
 - Choose Properties from the context menu.
 - General tab, Security, check the Unblock option.
3. Unzip the unblocked file.
 4. Open the extracted folder
 5. Copy the enclosed folder *ArcGISForAutoCAD.bundle* to your Autodesk Application Plugins folder (the default location is *C:\Program Files\Autodesk\ApplicationPlugins*).

Once installed the ESRI online web resource provided links to several helpful **tutorials**, which we would suggest are a great starting point before jumping in to using the plugin.



esri

ArcGIS for AutoCAD Video Tutorials

TESTER RESOURCES

- Project Home
- Install and Setup
- Video Tutorials
- Tips, Tricks and Resources
- User Forums

FEEDBACK

- Questionnaire

Video Tutorials

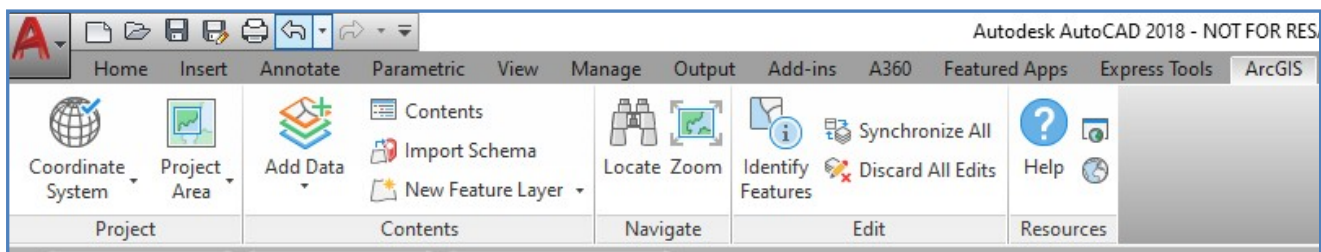
Please work on these tutorials in order. Each item depends on the last.

Title	Date
1. Add a Coordinate System and Map Layer to Your Drawing	2 Months ago
2. Add an ArcGIS Feature Layer from ArcGIS Online	2 Months ago
3. Add ArcGIS Online Subscription content	2 Months ago
4. Edit a Feature Layer and use the Locate tool	2 Months ago
5. Browse for content in your ArcGIS Enterprise Portal (optional)	2 Months ago
6. Create a document feature layer from existing AutoCAD data	2 Months ago

Having chosen to download the ArcGIS for AutoCAD **Auto Load** files, you now simply need to open AutoCAD and the plugin loads automatically once AutoCAD is initiated.

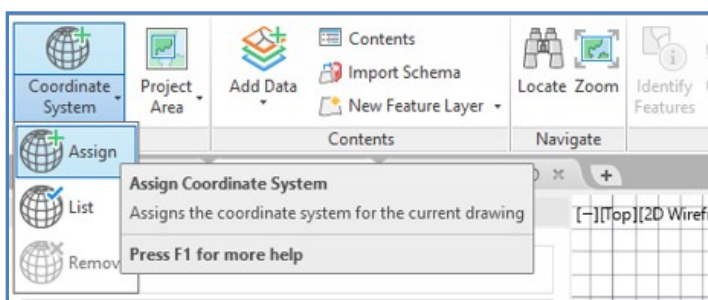


The plugin essentially provides an additional Menu item within AutoCAD called **ArcGIS**. Clicking on the new menu reveals the Ribbon and Tools available within the ArcGIS for AutoCAD plugin.

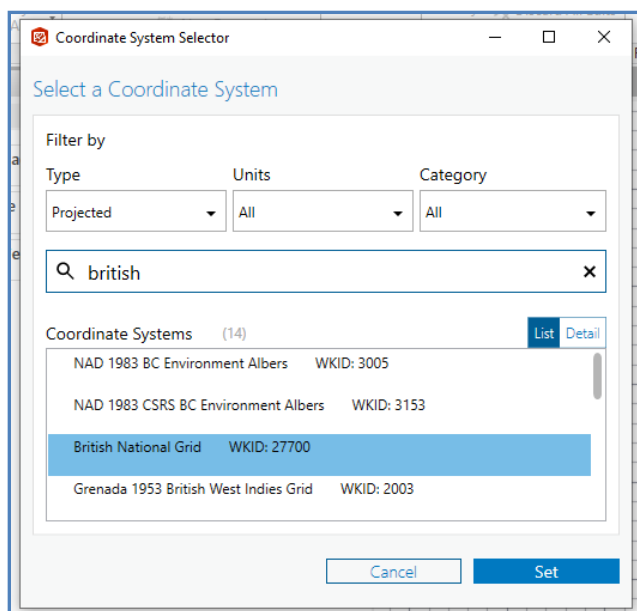


2 - Assigning a Coordinate System:

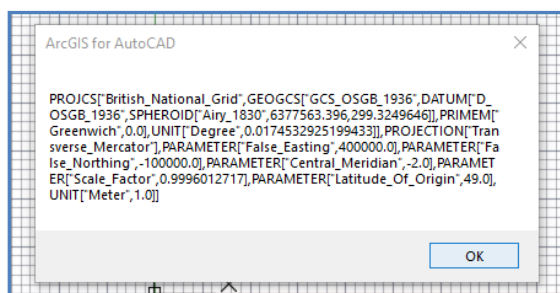
Before we start to add basemapping and geospatial assets to AutoCAD, we need to assign a Coordinate System. Having opened a blank Drawing from the ArcGIS ribbon choose the **Coordinate System** menu and choose **Assign**.



As we will be using spatial data from the UK, we will search for the word 'British', then choose the **British National Grid (27700)** Coordinate Reference System (CRS) and press **Set** to define the coordinate system to our CAD Drawing space.



Having set the CRS, choose **Coordinate System > List** and the current CRS will be shown – here it will now be **British National Grid** as we defined previously.



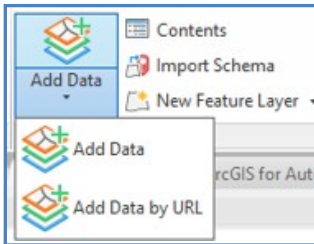
3 - Adding Map and Imagery Layers (Basemaps):

Having assigned the CRS to our new AutoCAD Drawing, we will choose to add some basemapping using the **Add Data** tool.

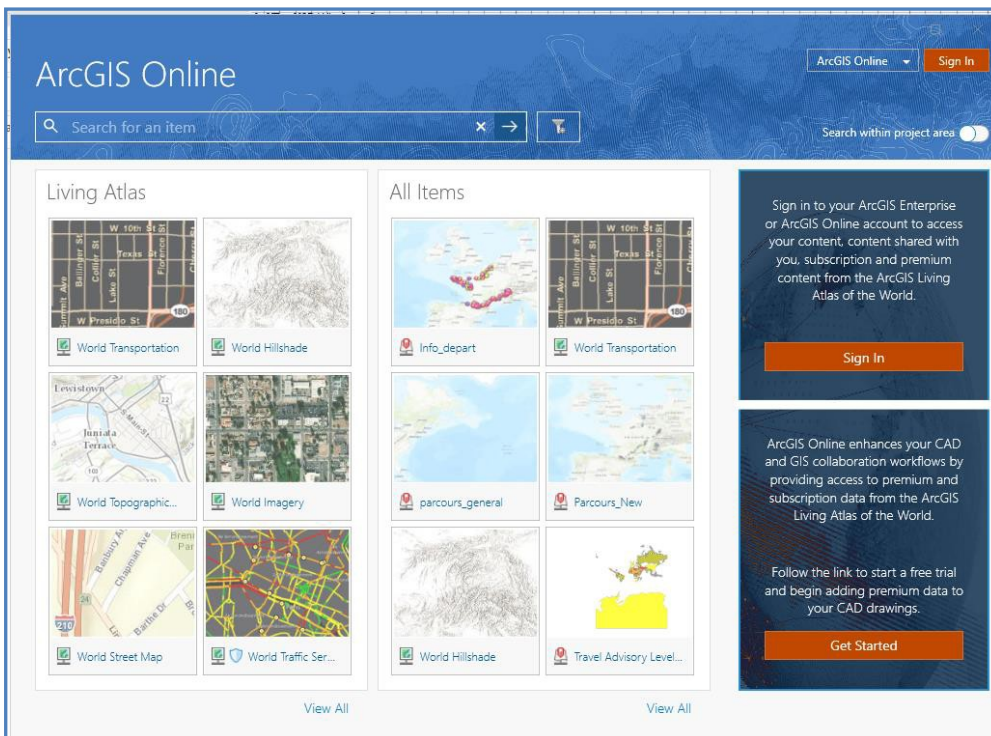




The Add Data tool provides two options. The first will **Add Data** from any ArcGIS Online resource and the second will **Add Data by URL**, where we can link to our own uniquely specified data resource.

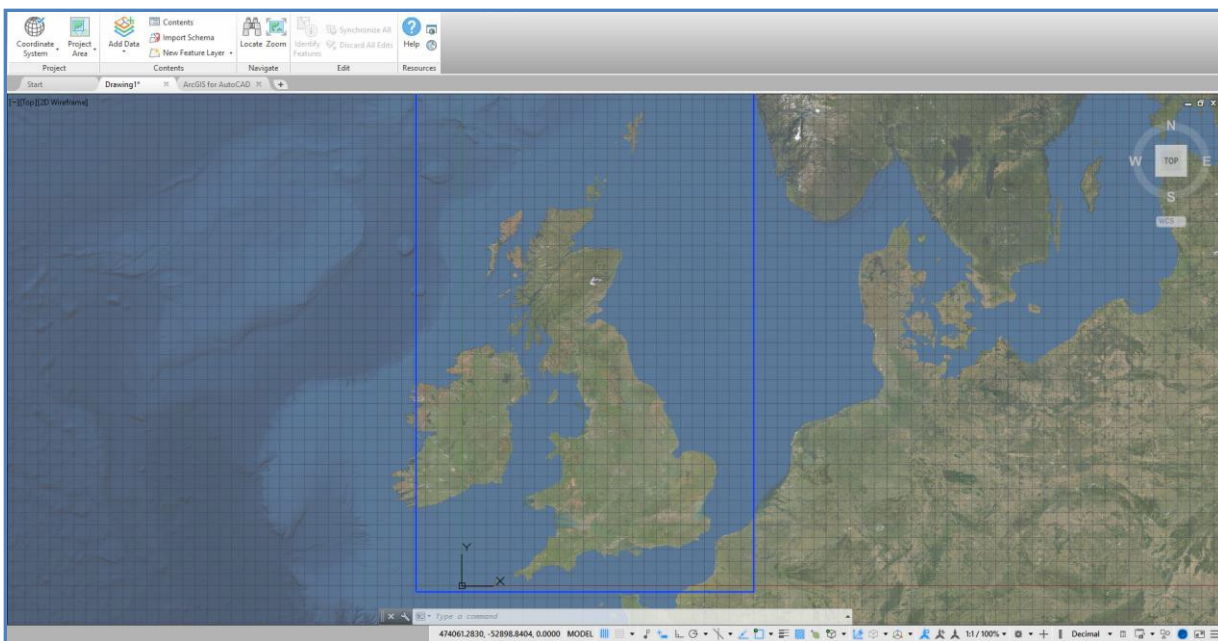
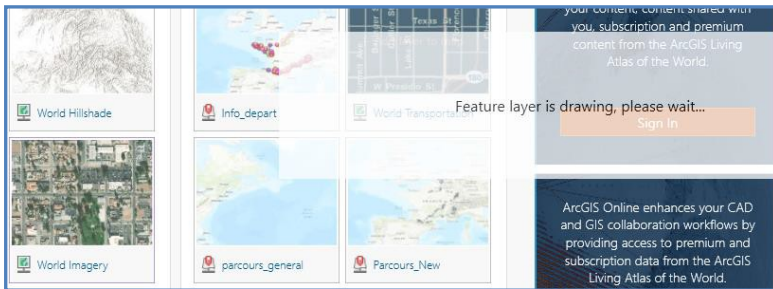


Choosing **Add Data**, a new window opens providing access to the **ArcGIS Online** resource of basemapping available in the **ESRI Living Atlas** and also shows spatial assets which are shared by other users. Later in this blog we will log into our ArcGIS Online account to access previously uploaded Cadline spatial (vector) assets, but for the moment we will choose to simply add a basemap. So, from the **Living Atlas** (left) pane we will choose the **World Imagery** resource.



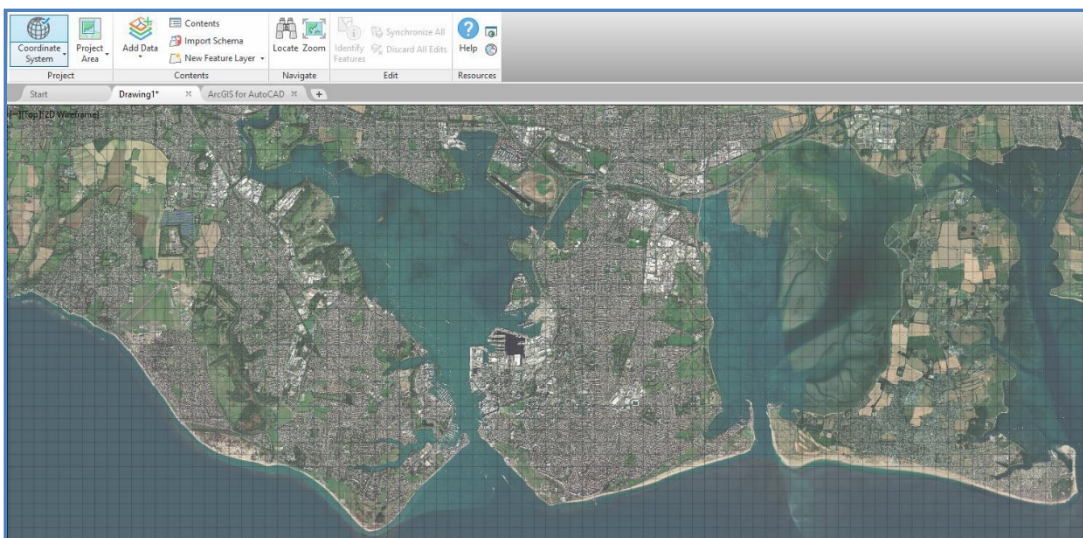
Having chosen World Imagery, the Feature Layer is added to the AutoCAD Drawing.





The **blue box** within the Drawing is the default **Project Area** based on the CRS that was chosen, in this case the British National Grid.

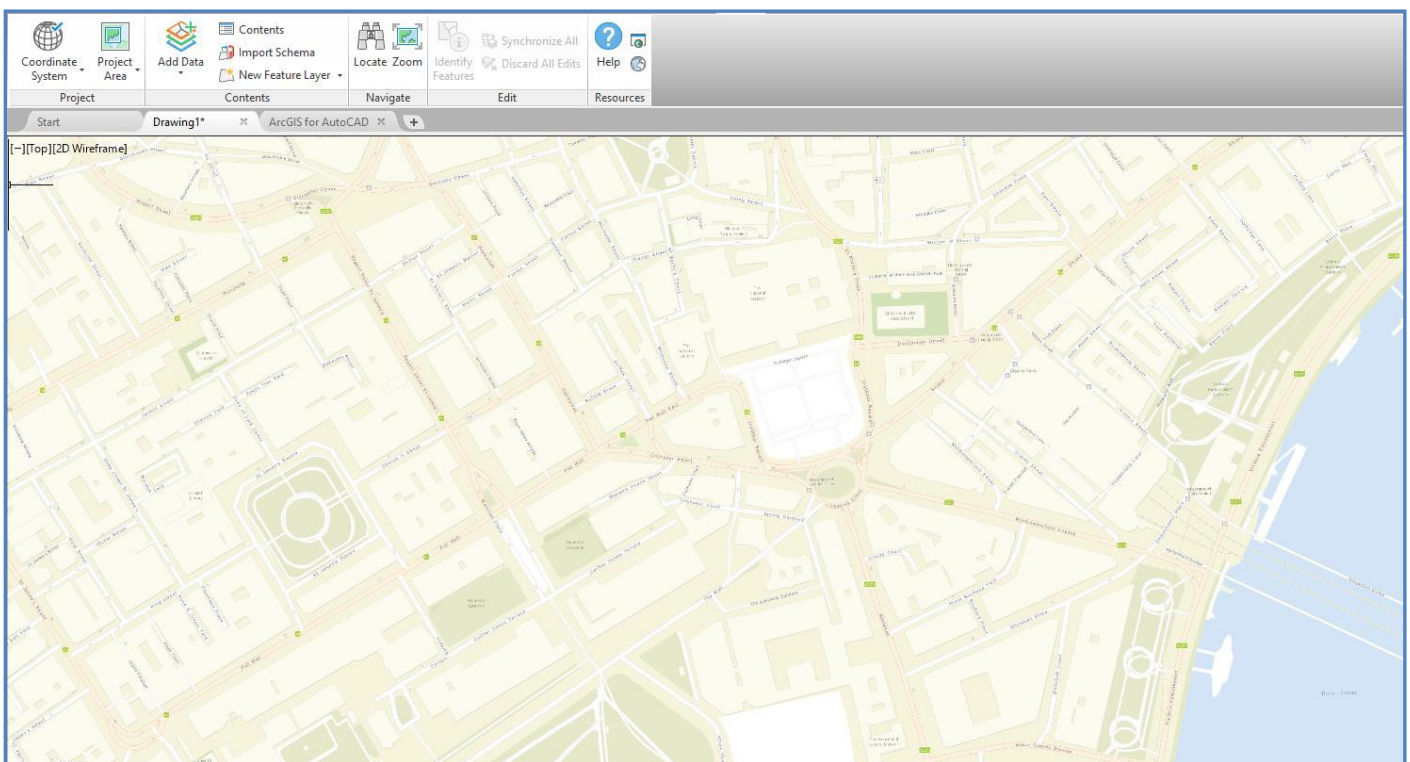
As you zoom into the Drawing the World Imagery basemapping updates to reflect the new area of interest.



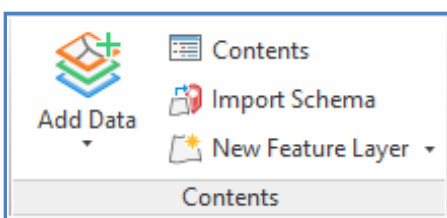
Using the **Add Data** tool we can choose another basemap from the ArcGIS Online Living Atlas e.g. **World Street Map**.



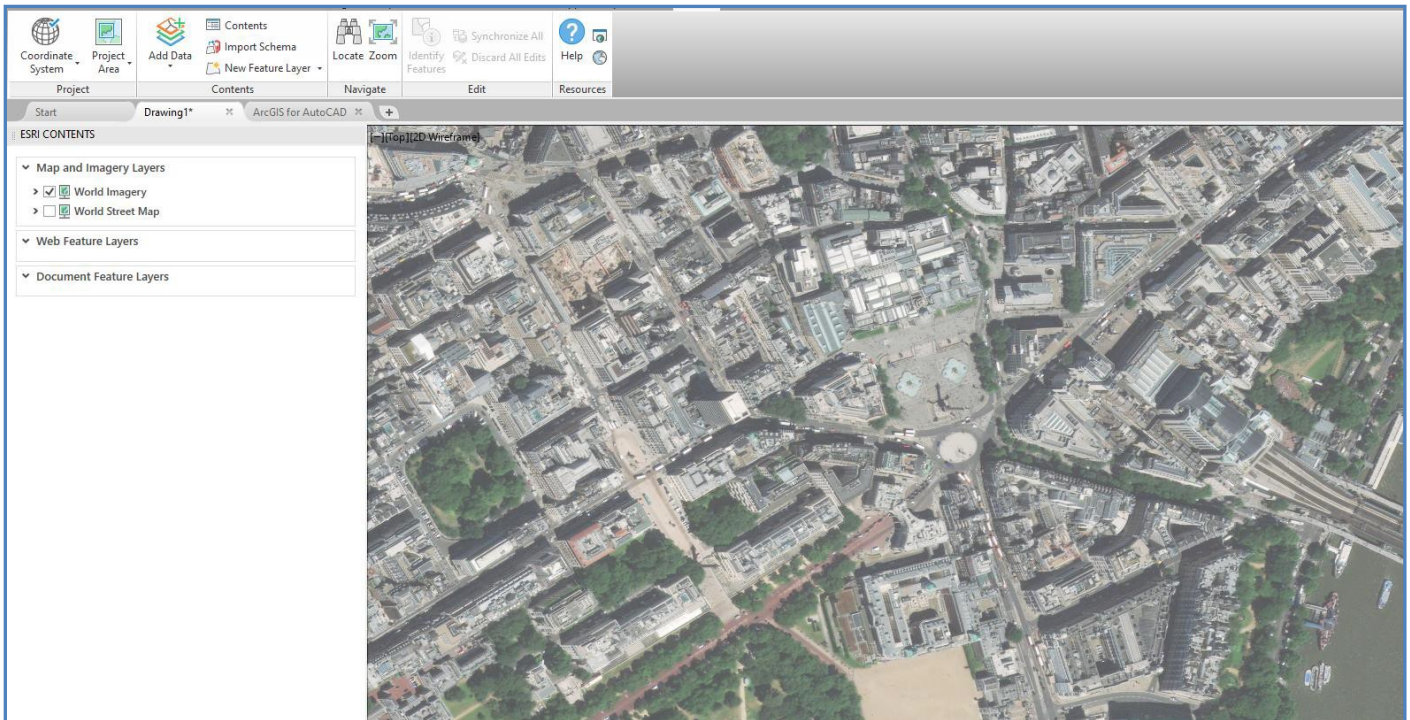
The AutoCAD Drawing is then updated to have an extra basemap showing the Roads in the UK. **Tip** – remove the **GRID** lines from the Drawing to see the basemapping more clearly.



To manage the Basemapping which is shown in the Drawing, choose the **Contents** tool from the **ArcGIS > Contents** Ribbon.

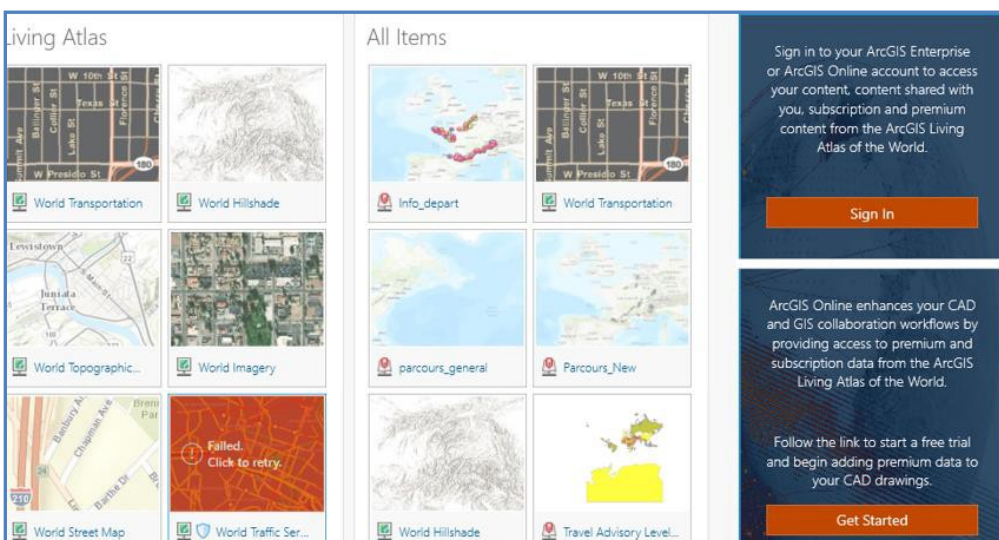


The **Contents** will open an extra pane (ESRI Contents) within AutoCAD, similar to a LAYERS panel in a GIS. In the **Map and Imagery Layers** section we can choose to **tick** and **untick** the basemapping that we have added so far e.g. ticking to display the **World Imagery** again.



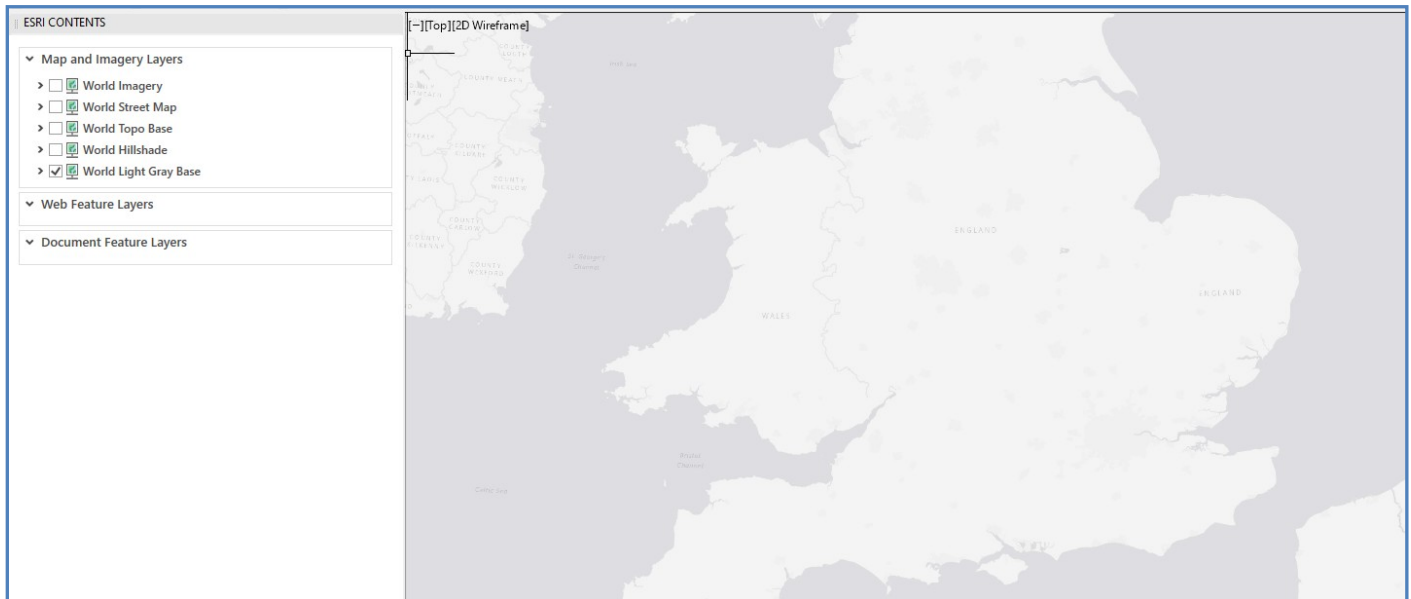
We will explore the ESRI Contents pane in more detail later in this blog.

Some of the content available within the Living Atlas is **freely available** and some layers e.g. the **World Traffic Service** require you to login with your **ArcGIS Online** account. If you don't have a valid ArcGIS Online (or Enterprise) account, the Service will Fail to load into the Drawing.

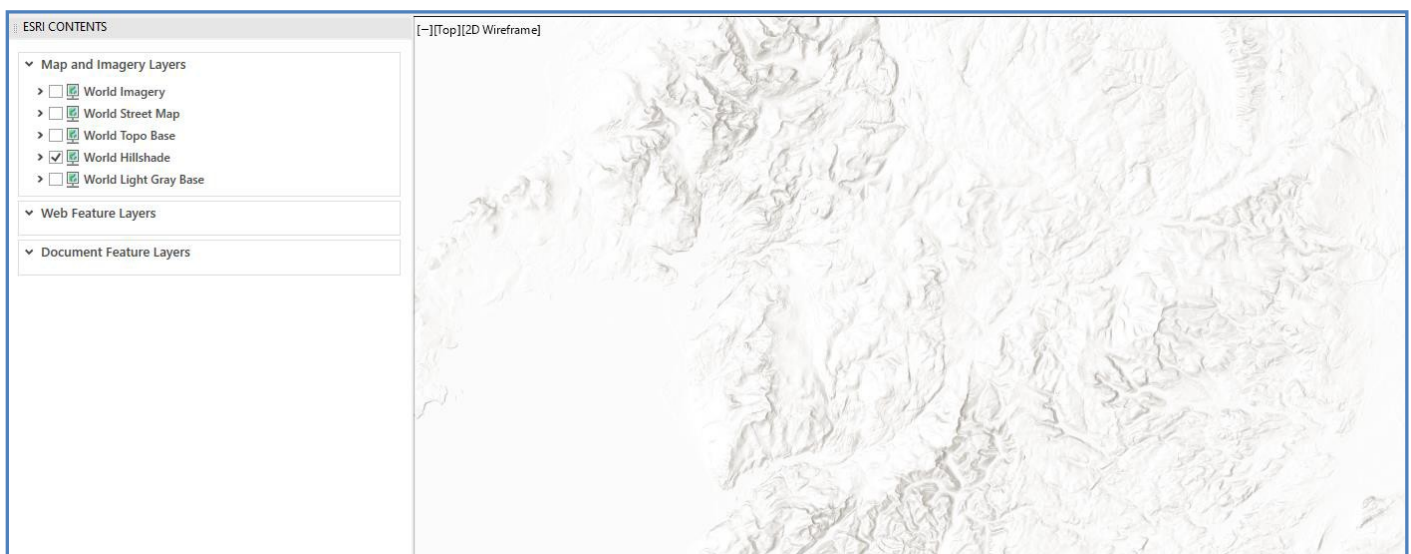


The Living Atlas provides access to many other useful basemaps, why not have a try to see ones that may be useful to you.... here are a couple more that I liked!

World Light Gray Basemap:



World Hillshade:



The ArcGIS Online Living Atlas also has access to several **Historic Mapping** Layers.



4 - Adding Web Feature Layers (Spatial Data):

The ArcGIS Online Living Atlas also provides access to several **spatial (vector)** data sources. For example, a simple search on the word - **Deprivation** - found a few useful results.

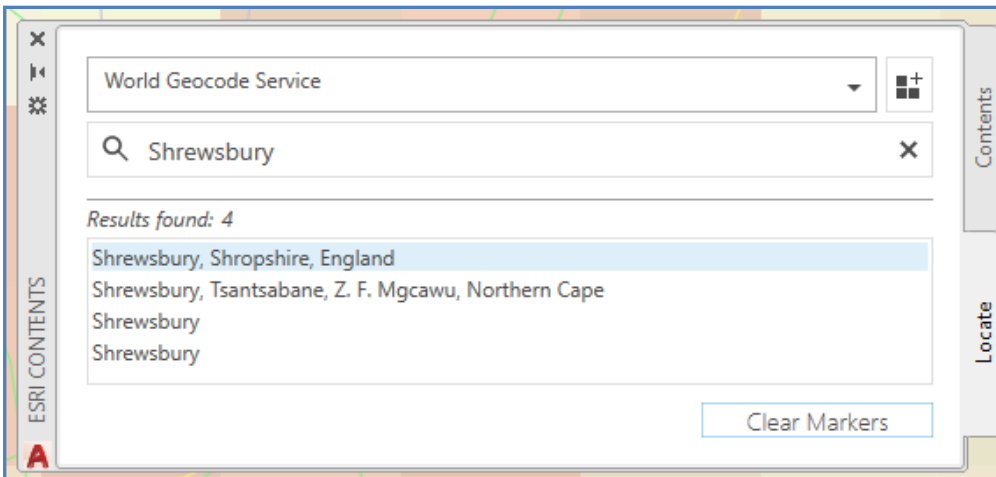
The screenshot shows the ArcGIS Online interface. At the top, there is a search bar containing the text 'deprivation'. Below the search bar, there are two main sections: 'Living Atlas' and 'All Items'. The 'Living Atlas' section displays several map thumbnails, including 'Indices of Multiple D...', 'OS Open Greenspace', and 'All Island Deprivatio...'. The 'All Items' section displays more map thumbnails, including 'New Zealand Demo...', 'Index of Multiple De...', and 'NZDep2013_WFL1'. On the right side of the interface, there is a sign-in prompt that reads: 'Sign in to your ArcGIS Enterprise or ArcGIS Online account to access your content, content shared with you, subscription and premium content from the ArcGIS Living Atlas of the World.' Below this prompt is a 'Sign In' button. Further down, there is another prompt: 'ArcGIS Online enhances your CAD and GIS collaboration workflows by providing access to premium and subscription data from the ArcGIS Living Atlas of the World.' Below this prompt is a 'Get Started' button.

Tip – before loading spatial assets you may wish to set a new **Project Area**. Leaving the Project Area set to the UK will mean that all features within the UK will be loaded and for Deprivation Polygons this exceeds 30,000 records.

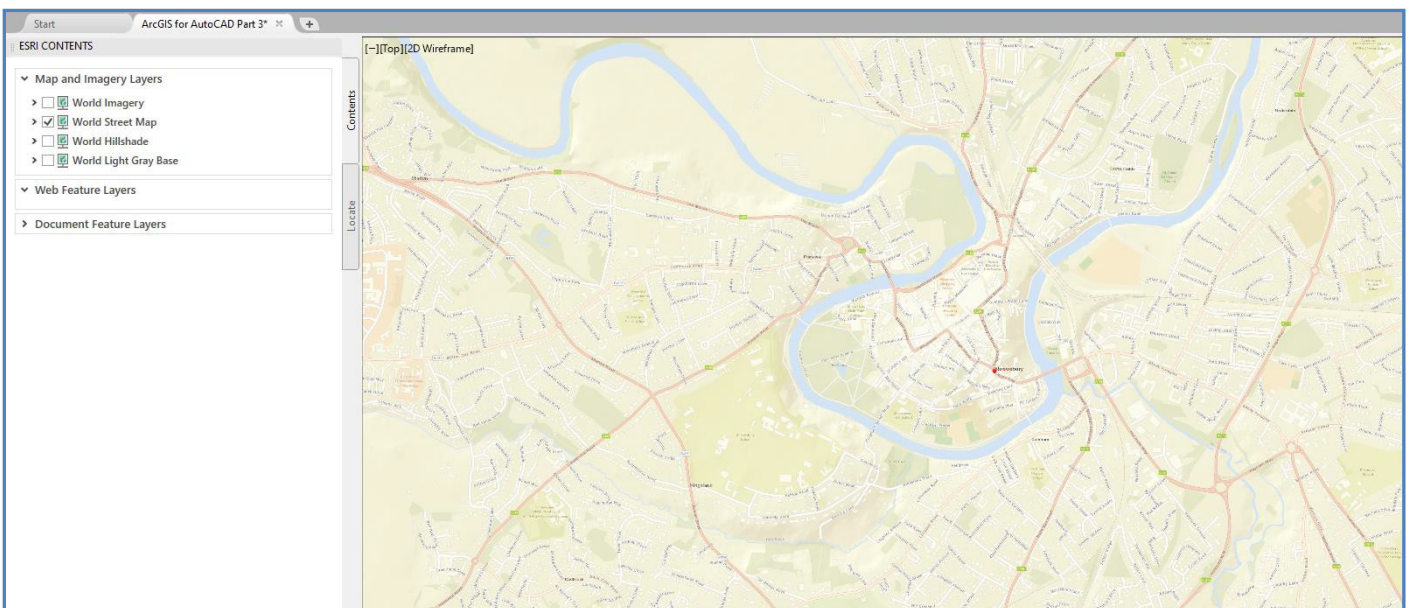
Using the **Locate** tool on the **Navigate** ribbon....



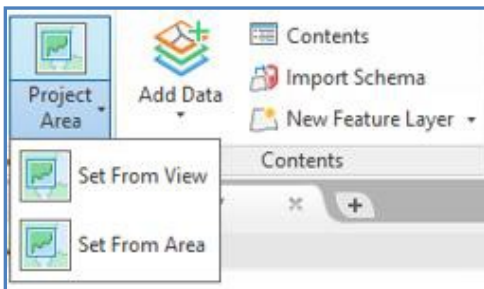
... you can type any **address** and the **World Geocode Service** will search for matches. In this example I have searched for **Shrewsbury** and found several results.



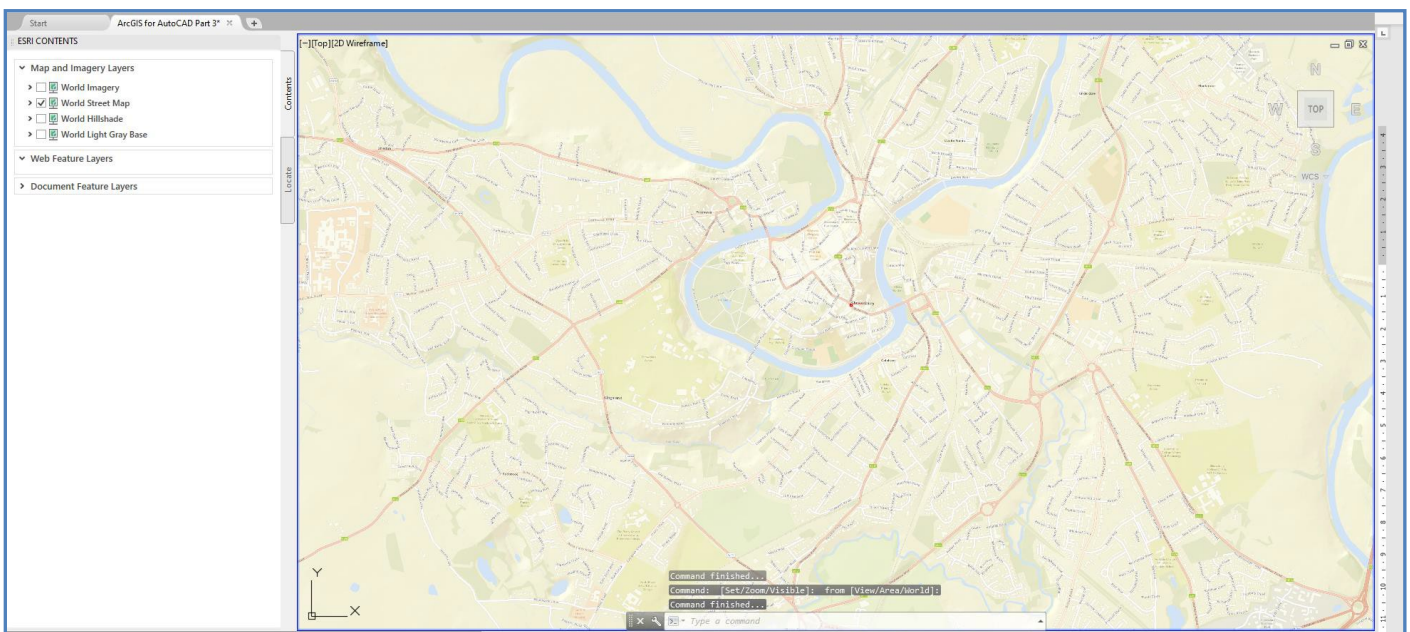
Double clicking on the top record will re-centre the Drawing over **Shrewsbury**.



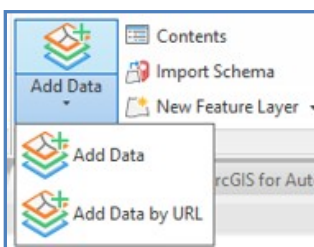
Having zoomed to the chosen location use the **Project Area** tool and choose **Set from View**.



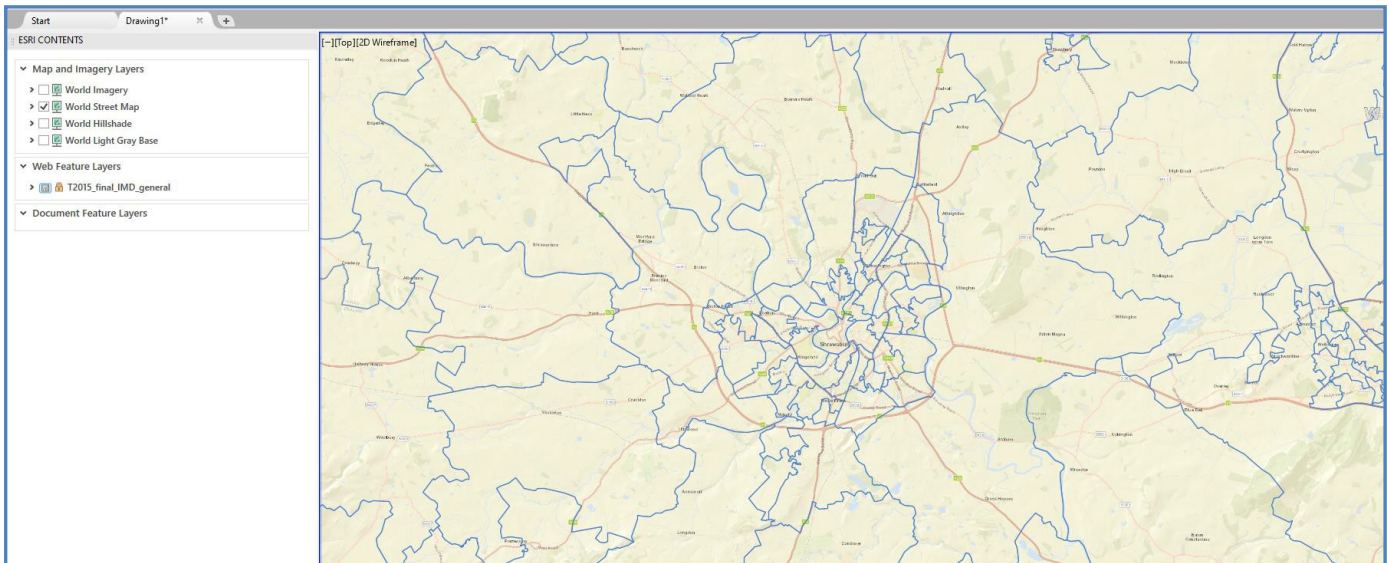
The **Blue Box** will be drawn around the whole Drawing/Map Extents – in this case Shrewsbury.



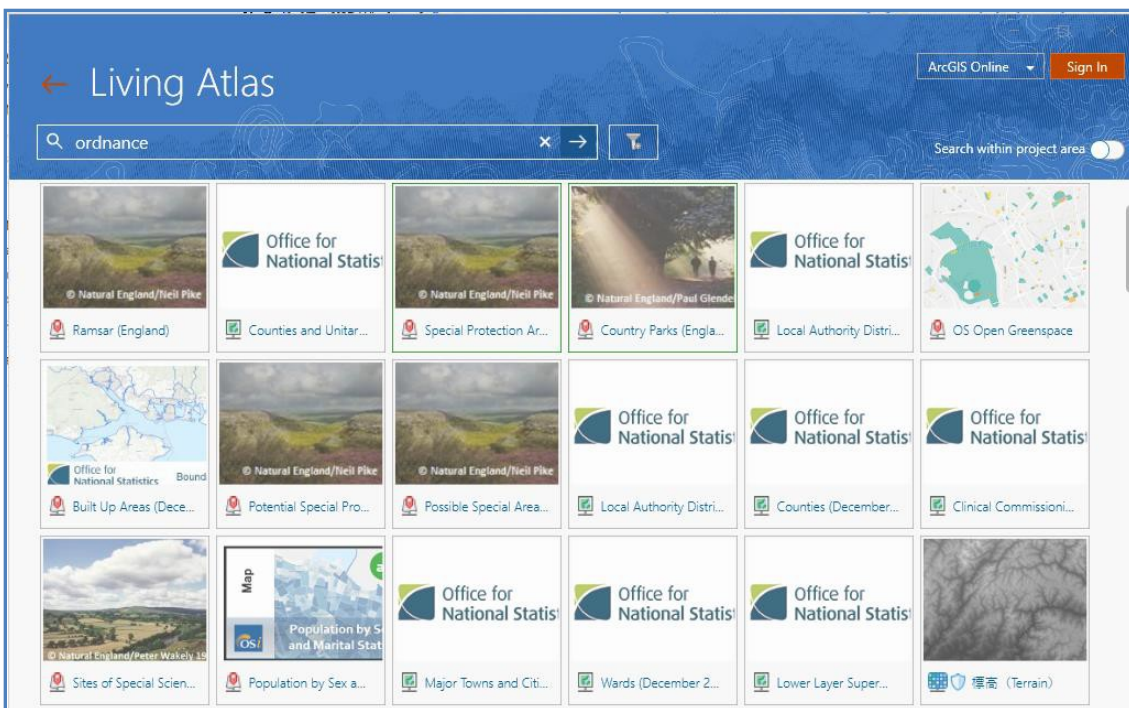
Now when adding the Deprivation data....



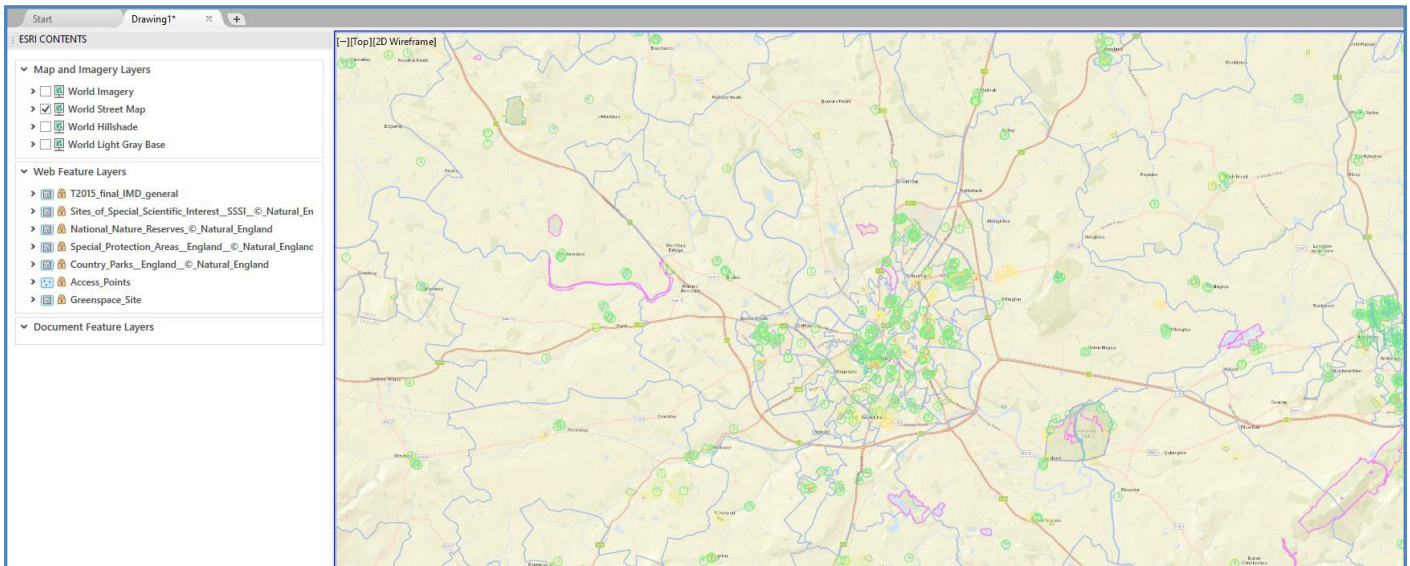
...only the Deprivation polygons within the Project Area (Shrewsbury) have been added to the Drawing.



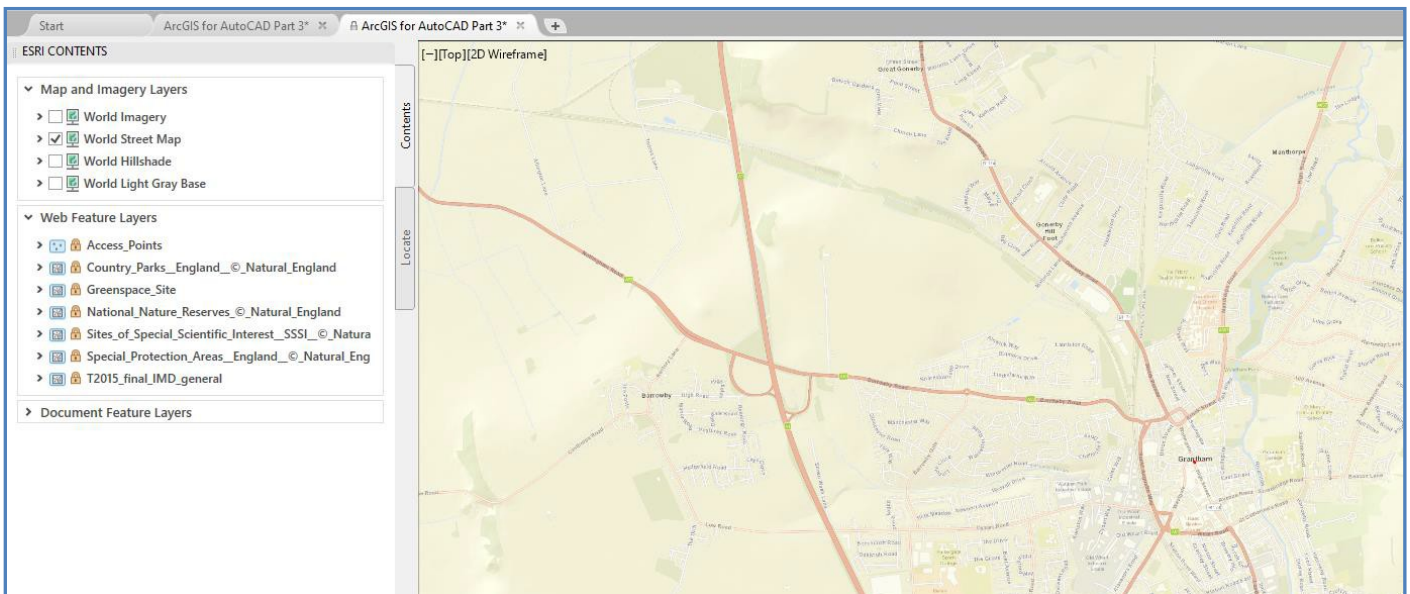
A search on the word – **Ordnance Survey** - found some more useful spatial datasets, such as Greenspaces, Sites of Special Scientific Interest, Nature Reserves, Special Protection Areas, Country Parks and lots of layers from the Office for National Statistics (ONS).



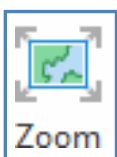
Adding these layers to the Drawing now meant that I had access to several **Ordnance Survey** and **ONS** datasets directly within CAD!



If you navigate away from the Project Area e.g. to **Grantham** in Lincolnshire, notice that the Web Feature Layers will not show any records as they were only downloaded for the previous Project Area – Shrewsbury.



To quickly navigate back to the Project Area (Shrewsbury) choose the **Zoom** button from the **Navigate ribbon**.

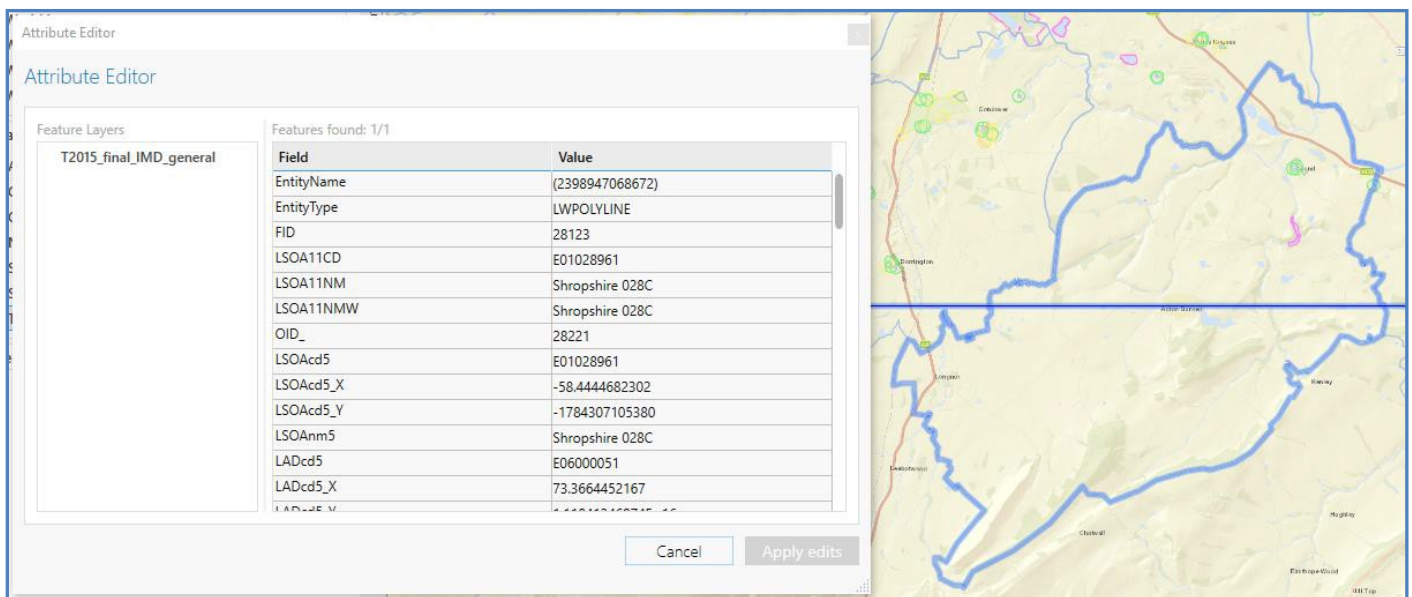


5 - Working with Attributes:

Now that we have accessed spatial assets, we can start to use AutoCAD as if we were within a **GIS** application. Geospatial datasets have **attributes** attached to each feature which can be used to filter data and create thematic maps. The ArcGIS for AutoCAD Plugin has an **Identify Features** tool which allows you to select Drawing objects to view their asset information.



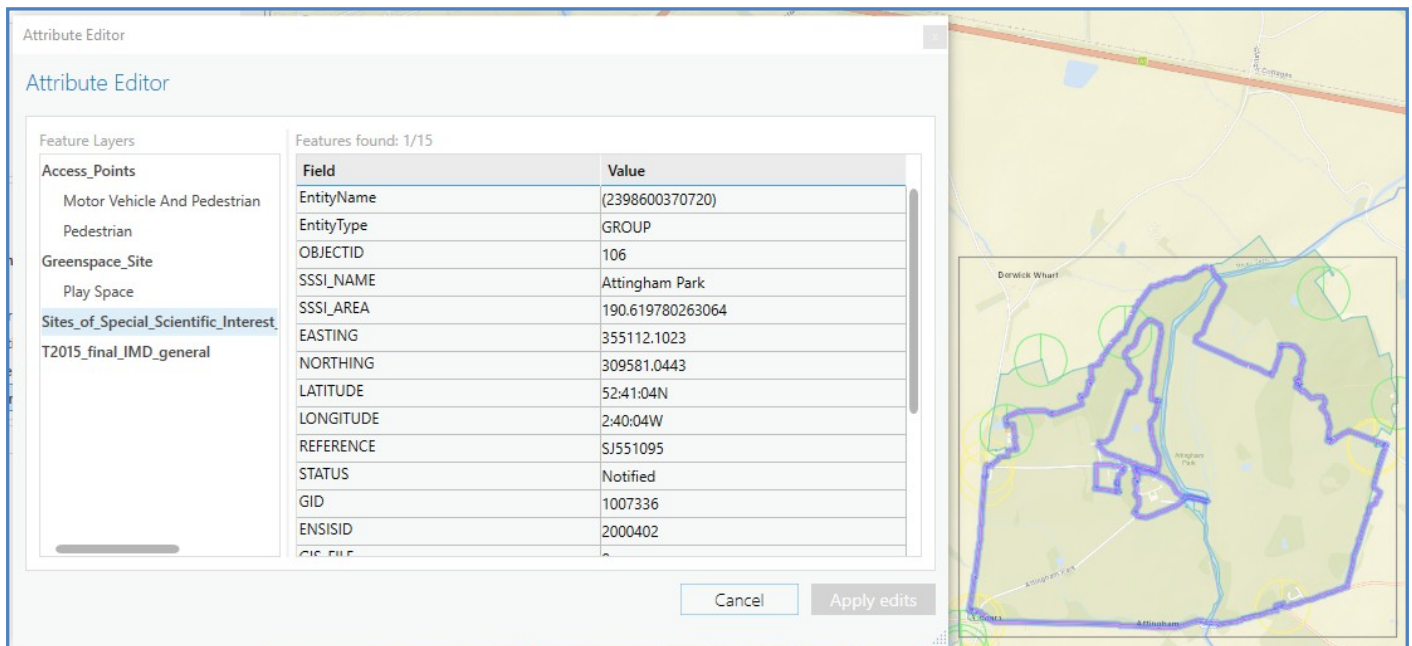
Left click once and **select** one Drawing object and then choose the **Identify Features** tool to open the **Attribute Editor** for that pre-selected feature – in this case a Deprivation Polygon.



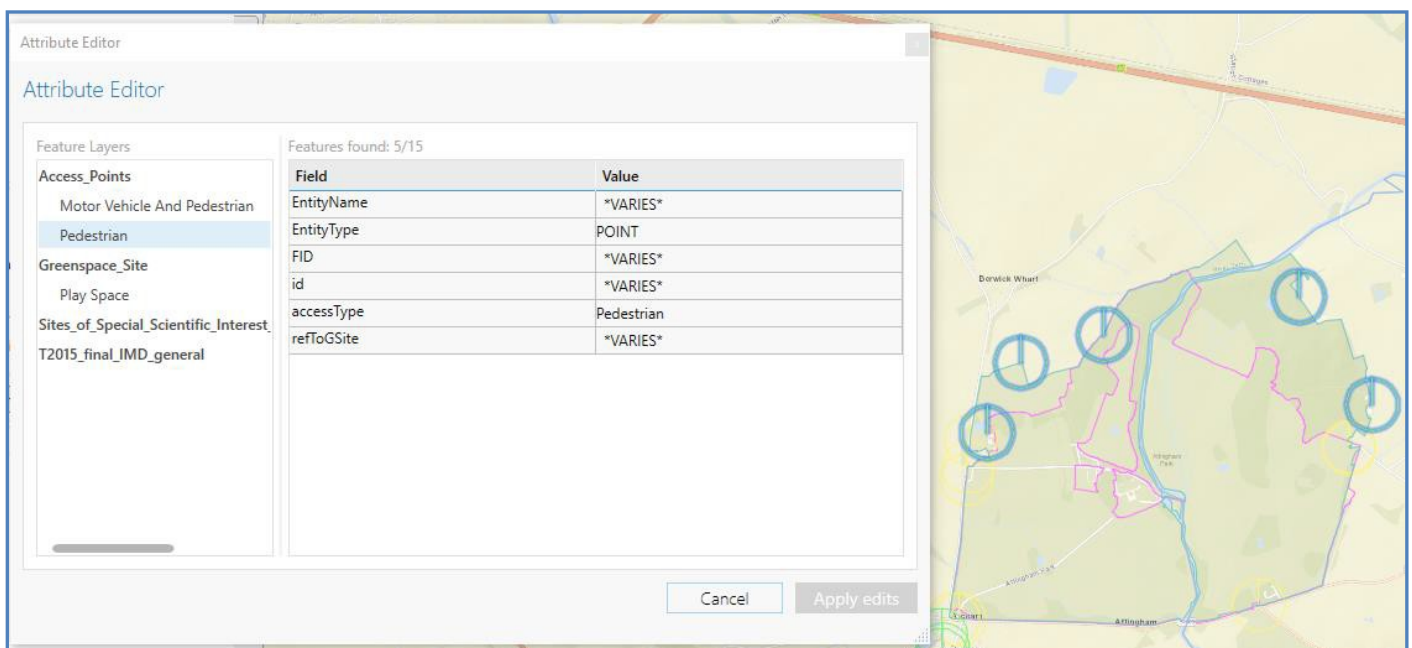
On the left the Attribute Editor shows the list of **Feature Layers** and on the right provides the **attribute information** for each record selected. Here we can see the information attached to the Deprivation polygon e.g. Local Authority Name – Shropshire.

If you pre-select **multiple objects** from multiple layers and choose the Identify Features button the Attribute Editor will open and list each layer on the left e.g. **Sites of Special Scientific Interest**. Select a Feature Layer e.g. **SSSI** and this will then highlight each record in that Feature Layer in **blue** within the Drawing.

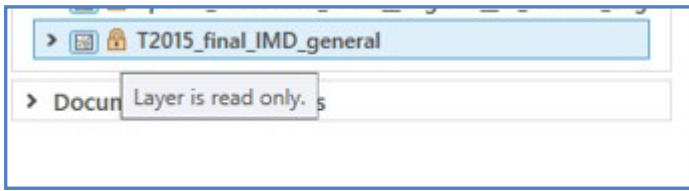




Choosing another Feature Layer from the list will then highlight their map features e.g. the **Pedestrian Access Points**.



The Feature Layers loaded from ArcGIS Online are Read Only.

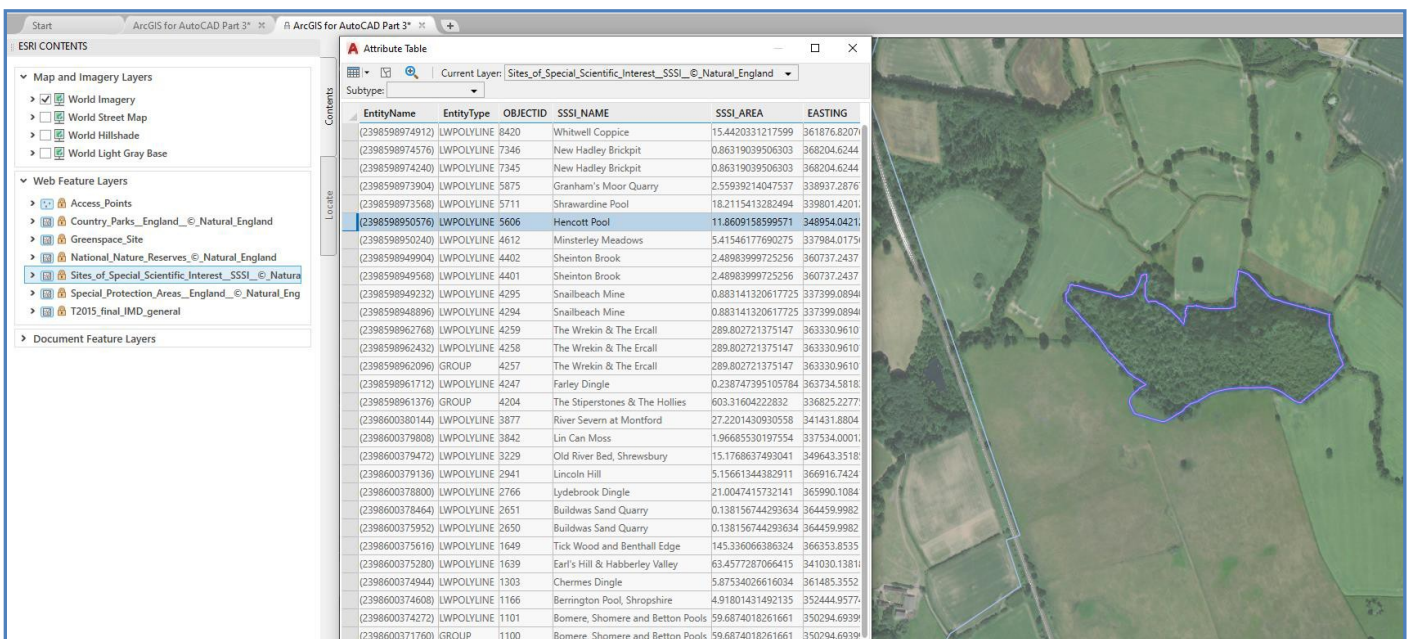


This means the attributes within the Attribute Editor cannot be updated for these layers.

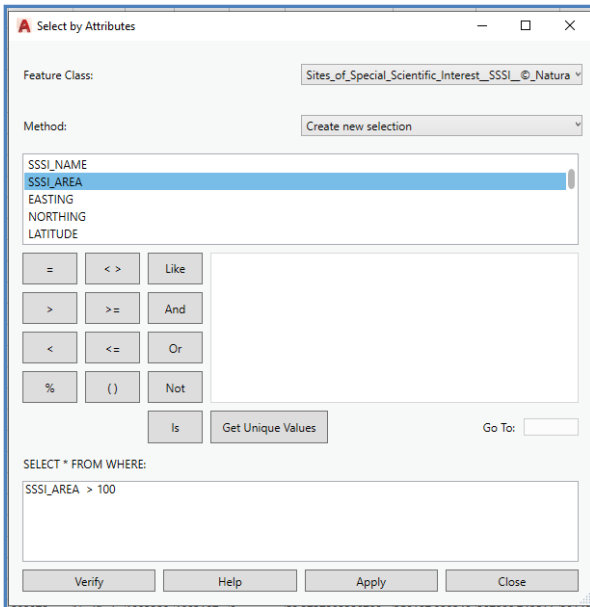
In addition to the Identify Features tool you can also view a table of **all the records** in a Map Feature Layer. This is activated by **right clicking** on the Layer in the **ESRI Contents** pane and choosing **Attribute Table**. A pop out Attribute window will open listing all the records in the chosen Feature Layer.

EntityName	EntityType	OBJECTID	SSSI_NAME	SSSI_AREA	EASTING	NORTHING	LATITUDE	LONGITUDE	REFERENCE	STATUS	GID	ENSISID	GIS_FILE	AREA
(2398598974912)	LWPOLYLINE	8420	Whitwell Coppice	15.4420331217599	361876.82076	302123.194705	52:37:04N	2:34:07W	SJ618021	Notified	1002191	1003199	0	15.4420331217599
(2398598974576)	LWPOLYLINE	7346	New Hadley Brickpit	0.86319039506303	368204.6244	311665.3956	52:42:06N	2:28:19W	SJ682116	Notified	1481404	1005646	0	0.15197327838
(2398598974240)	LWPOLYLINE	7345	New Hadley Brickpit	0.86319039506303	368204.6244	311665.3956	52:42:06N	2:28:19W	SJ682116	Notified	1481404	1005646	0	0.15197327838
(2398598973904)	LWPOLYLINE	5875	Graham's Moor Quarry	2.55939214047537	338937.287679	303682.124842	52:38:21N	2:54:12W	SJ389036	Notified	1002304	1003324	0	2.55939214047537
(2398598973568)	LWPOLYLINE	5711	Shrawardine Pool	18.2115413282494	339801.420121	316193.361529	52:44:24N	2:54:24W	SJ398161	Notified	1002326	1004361	0	18.2115413282494
(2398598950576)	LWPOLYLINE	5606	Hencott Pool	11.8609158599571	348954.042128	316075.790352	52:44:23N	2:45:27W	SJ489160	Notified	1002661	1000173	0	11.8609158599571
(2398598950240)	LWPOLYLINE	4612	Minsterley Meadows	5.41546177690275	337984.017564	304773.78891	52:38:13N	2:55:04W	SJ379047	Notified	1007172	2000270	0	5.41546177690275
(2398598949904)	LWPOLYLINE	4402	Sheinton Brook	2.48983999725256	360737.2437	303867.9726	52:38:07N	2:35:06W	SJ607038	Notified	1002323	1004309	0	0.96625105089
(2398598949568)	LWPOLYLINE	4401	Sheinton Brook	2.48983999725256	360737.2437	303867.9726	52:38:07N	2:35:06W	SJ607038	Notified	1002323	1004309	0	0.96625105089
(2398598949232)	LWPOLYLINE	4295	Snailbeach Mine	0.883141320617725	337399.089409	302236.62137	52:37:08N	2:56:26W	SJ373022	Notified	1002047	2000294	0	0.31238771060
(2398598948896)	LWPOLYLINE	4294	Snailbeach Mine	0.883141320617725	337399.089409	302236.62137	52:37:08N	2:56:26W	SJ373022	Notified	1002047	2000294	0	0.31238771060
(2398598962768)	LWPOLYLINE	4259	The Wrekin & The Ercall	289.802721375147	363330.961014	308665.517471	52:40:28N	2:33:22W	SJ633086	Notified	1002339	1001585	0	1.138017405107
(2398598962432)	LWPOLYLINE	4258	The Wrekin & The Ercall	289.802721375147	363330.961014	308665.517471	52:40:28N	2:33:22W	SJ633086	Notified	1002339	1001585	0	73.0597038625
(2398598962096)	GROUP	4257	The Wrekin & The Ercall	289.802721375147	363330.961014	308665.517471	52:40:28N	2:33:22W	SJ633086	Notified	1002339	1001585	0	215.605000107
(2398598961712)	LWPOLYLINE	4247	Farley Dingle	0.238747395105784	363734.581833	302603.970829	52:37:11N	2:32:13W	SJ637026	Notified	1002165	1002128	0	0.238747395107
(2398598961376)	GROUP	4204	The Stiperstones & The Hollies	603.31604222832	336825.227757	299535.397369	52:35:23N	2:56:02W	SO368995	Notified	1002328	1002195	0	535.178253783
(2398600380144)	LWPOLYLINE	3877	River Severn at Montford	27.2201430930558	341431.8804	314449.6534	52:43:28N	2:52:07W	SJ414144	Notified	1002048	1005988	0	27.2201430930558
(2398600379808)	LWPOLYLINE	3842	Lin Can Moss	1.96685530197554	337534.000127	321104.479003	52:47:01N	2:56:20W	SJ375211	Notified	1002663	1000221	0	1.96685530197554

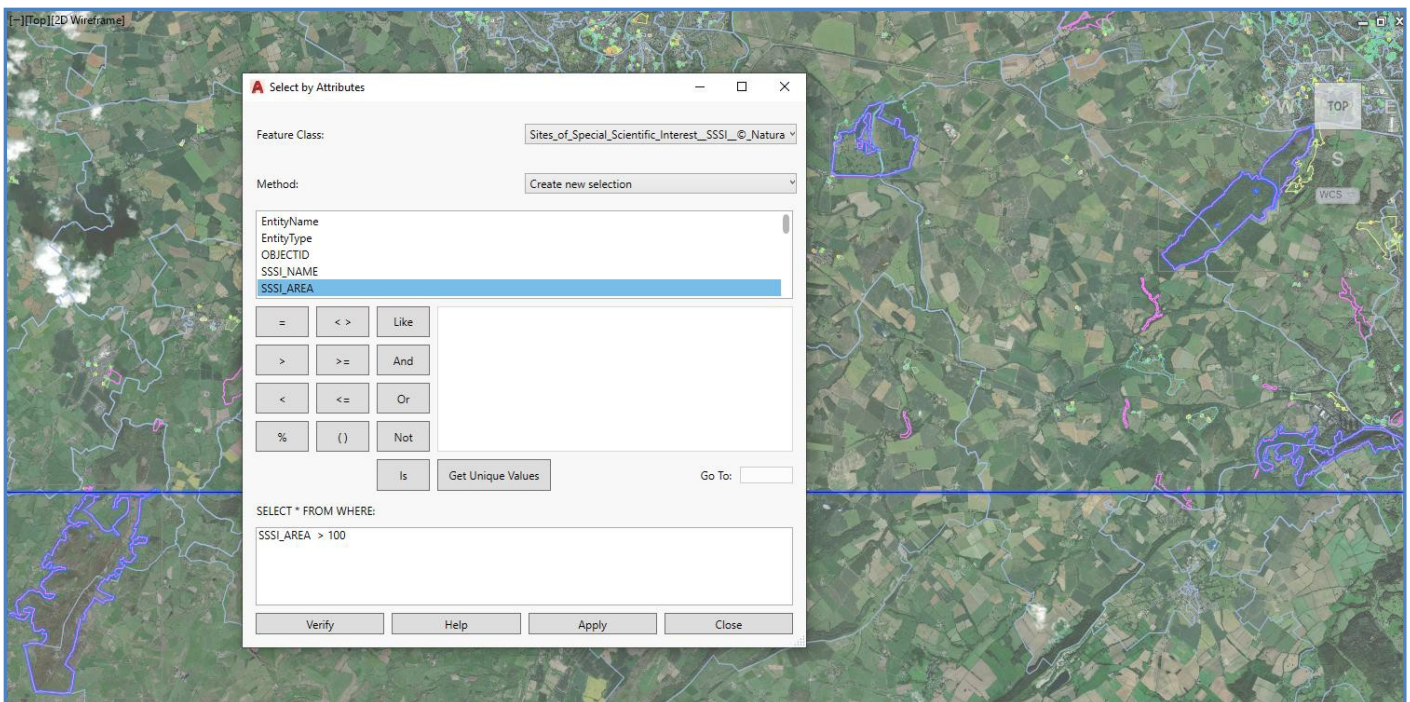
If you **Select** a record in the Attribute table, you can choose the **magnifying glass** to zoom to the selected record.



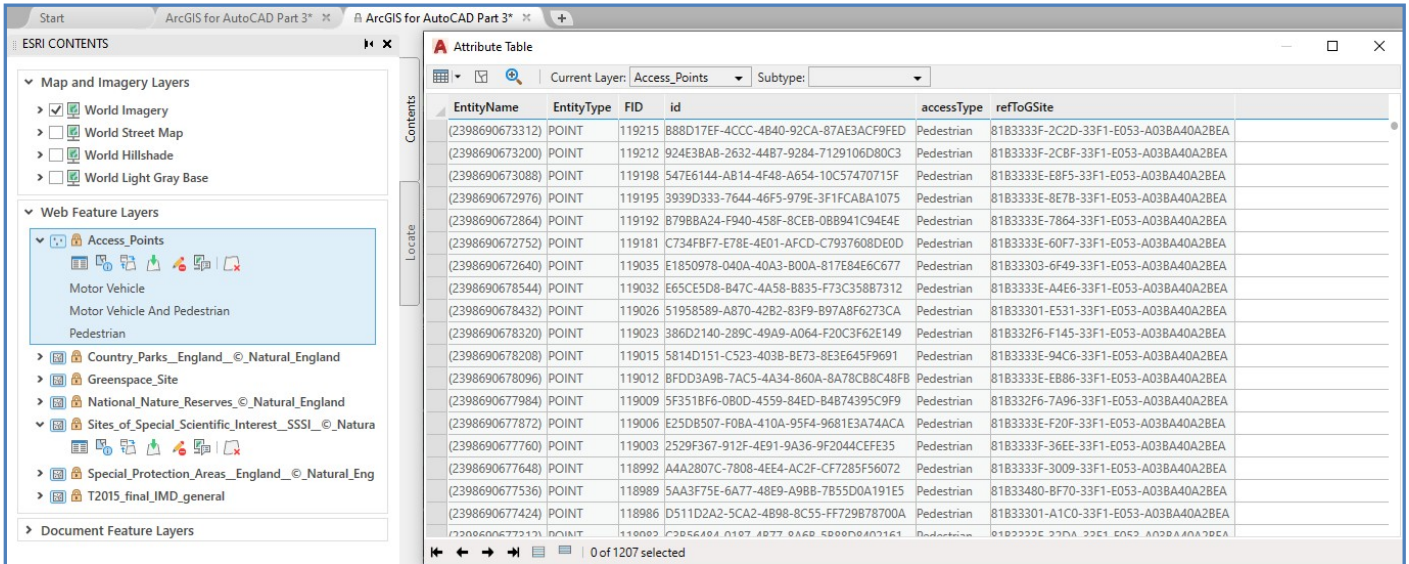
From the Attribute Table choose **Select by Attributes** and a SQL Query window will open allowing you to query and filter the Map Layer. For example, we could write a query to find all **SSSI polygons** where their **AREA is greater than 100**.



Applying the results will highlight all the SSSI map objects whose area is greater than 100 in the Drawing space.



Another quick way to filter the records in a Map Feature Layer is to choose from the **Subtype** list box. For example, when viewing the Attribute Table for all the Access Points there are **1,207** records.



Using the **Subtype** drop down we can choose to filter the Attribute Table to show only those records where the Access Type is **'Pedestrian'**- **987**.

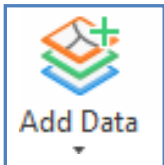
EntityName	EntityType	FID	id	accessType
(2398690673312)	POINT	119215	B88D17EF-4CCC-4B40-92CA-87AE3ACF9FED	Pedestrian
(2398690673200)	POINT	119212	924E3BAB-2632-44B7-9284-7129106D80C3	Pedestrian
(2398690673088)	POINT	119198	547E6144-AB14-4F48-A654-10C57470715F	Pedestrian
(2398690672976)	POINT	119195	3939D333-7644-46F5-979E-3F1FCABA1075	Pedestrian
(2398690672864)	POINT	119192	B79BBA24-F940-458F-8CEB-08B941C94E4E	Pedestrian
(2398690672752)	POINT	119181	C734FBF7-E78E-4E01-AFCD-C7937608DE0D	Pedestrian
(2398690672640)	POINT	119035	E1850978-040A-40A3-B00A-817E84E6C677	Pedestrian
(2398690678544)	POINT	119032	E65CE5D8-B47C-4A58-B835-F73C358B7312	Pedestrian
(2398690678432)	POINT	119026	51958589-A870-42B2-83F9-B97A8F6273CA	Pedestrian

So far, we have found that the ArcGIS for AutoCAD Plugin allows you to gain access to a number of useful basemaps and spatial assets from the **ESRI Living Atlas**. In addition, tools such as the **Locate**, **Zoom**, **Identify** and **Attribute Query** mean that we now have **GIS related tools and functionality** within our AutoCAD interface!

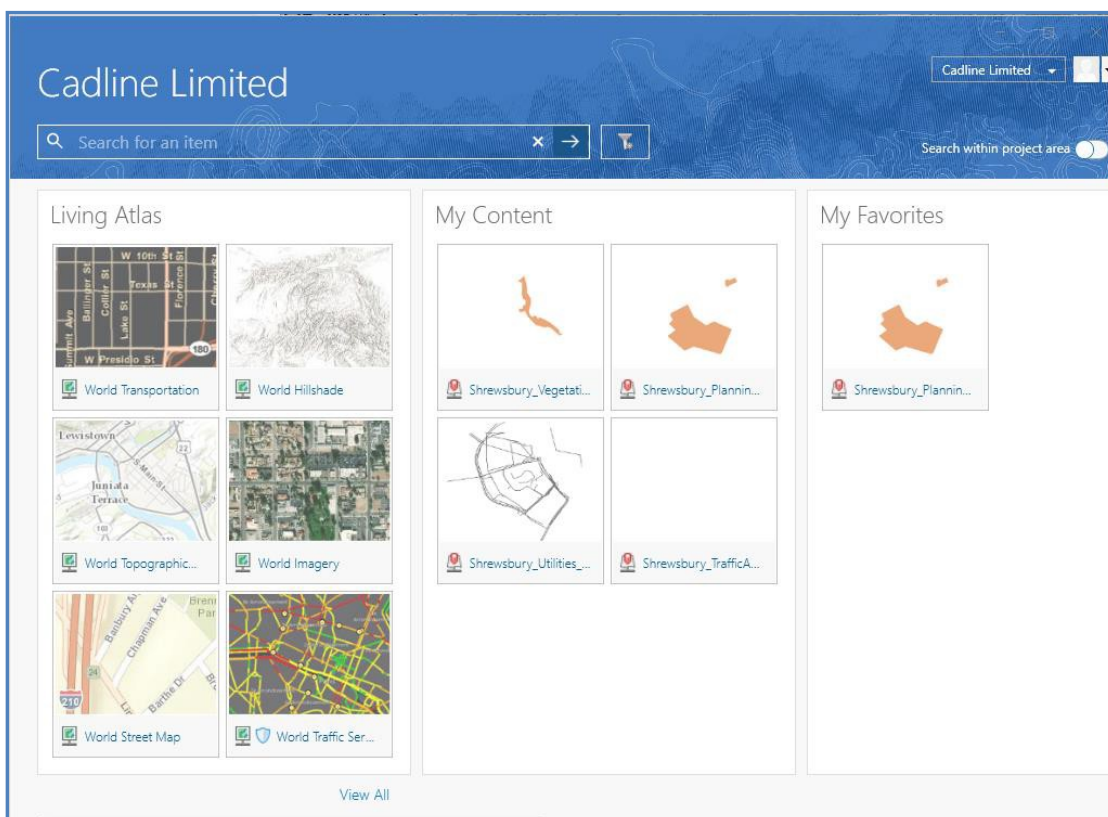
In the final section we will explore how to access our own geospatial assets, undertake spatial and attribute updates and synchronise those changes for others to see in their Autodesk and GIS applications.

6 - Working with Your Own Content:

Using the **Add Data** tool, we will choose to **Sign In** to the **Cadline ArcGIS Online** account.



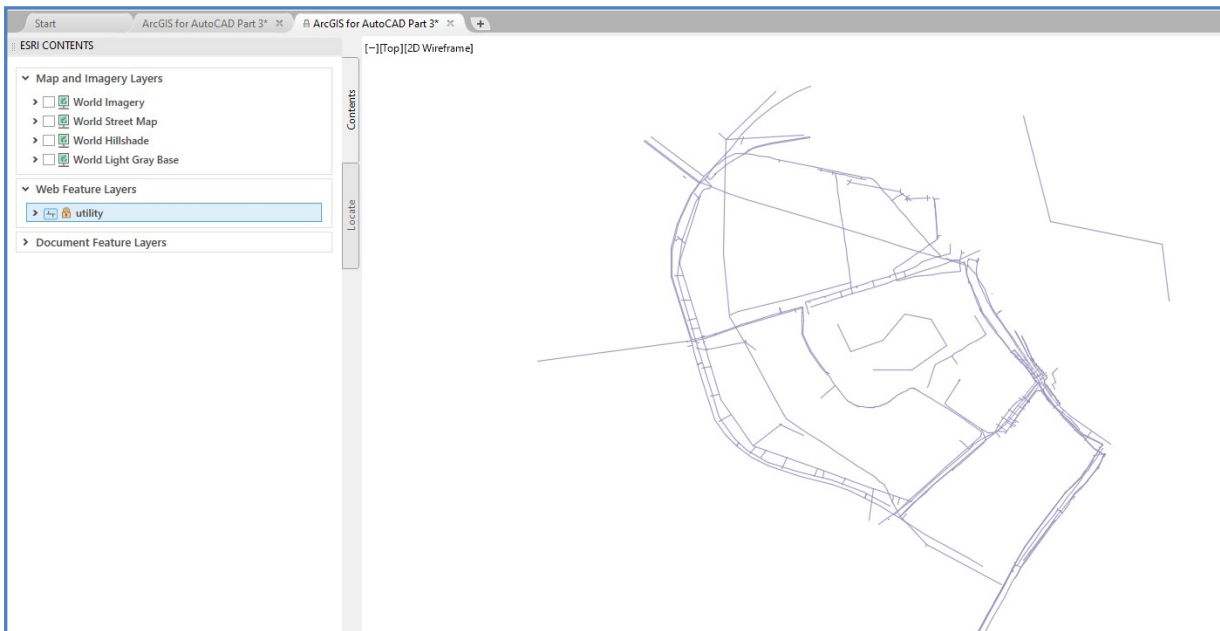
Having **Signed In** if you now choose the **Search within project area** the list of available Layers in the **My Content** Pane updates to reflect the data available for the current project area - **Shrewsbury**.



Choosing to Add the Utility Layer ...



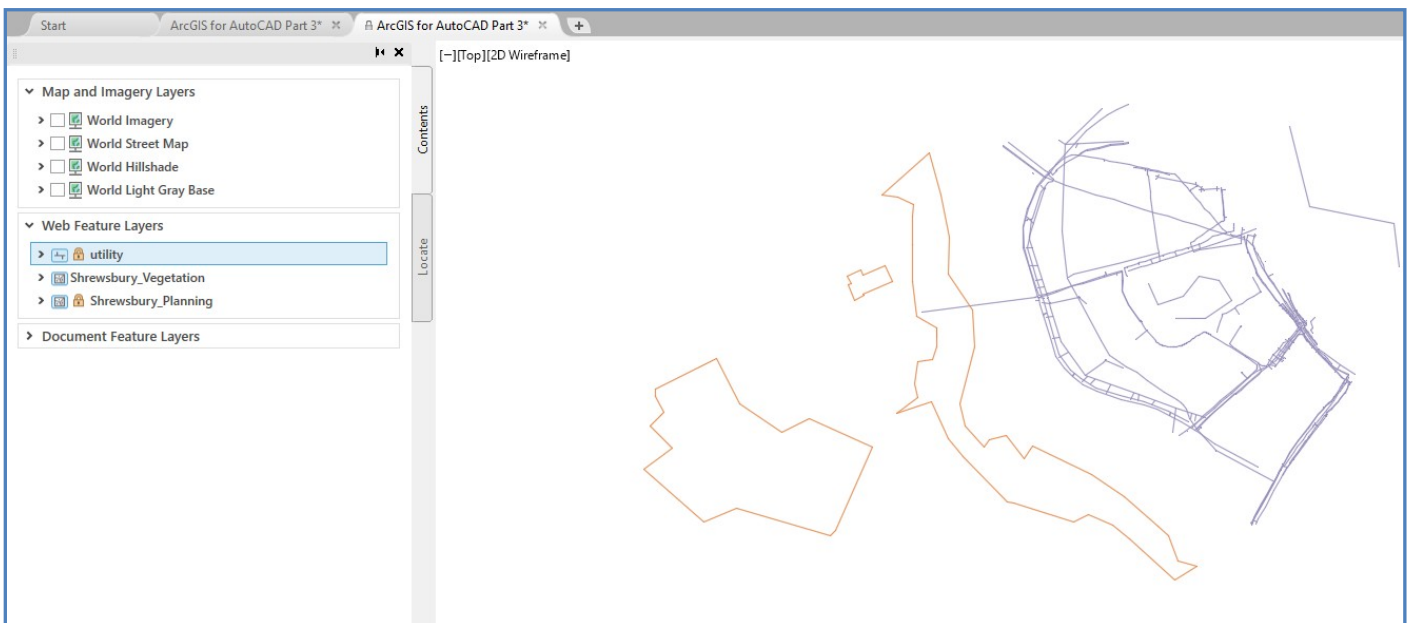
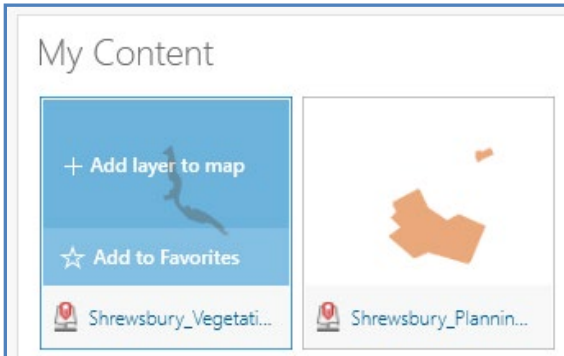
.. will then add the Utility feature dataset from the Cadline ArcGIS Online Account into the AutoCAD Drawing as Polyline objects.



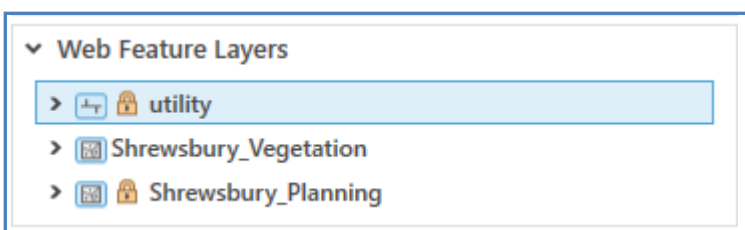
Again, with access to the attributes for each feature within the **Attribute Table**.

EntityName	EntityType	FID	fid_1	layer	height
(2398957519744)	LWPOLYLINE	455	{46dc4f82-febd-43da-884f-12ba9b572ddf}	ESRI_utility	-5
(2398957519632)	LWPOLYLINE	454	{17a99a2b-cccd-465a-b9e2-d1db6240b374}	ESRI_utility	-5
(2398957519520)	LWPOLYLINE	452	{4cadde58-3a87-44ac-961b-48a1287f9136}	ESRI_utility	-5
(2398957519408)	LWPOLYLINE	449	{1d03e162-9e5e-4158-b622-2f8bc2e2fac}	ESRI_utility	-5
(2398957519296)	LWPOLYLINE	448	{f6a1f0d8-2832-4132-bf09-cbde8c17e0c7}	ESRI_utility	-5
(2398957519184)	LWPOLYLINE	446	{03250462-6b71-4988-8d94-43833990d58a}	ESRI_utility	-5
(2398957519072)	LWPOLYLINE	443	{3ef8dd73-ee34-4fff-831c-3e0109b47158}	ESRI_utility	-5
(2398957518960)	LWPOLYLINE	440	{830b3505-d1d6-4357-a26b-009a918d2f1a}	ESRI_utility	-5
(2398957518848)	LWPOLYLINE	437	{9a6a691e-6fda-40c3-a519-0eacd0fc558}	ESRI_utility	-5
(2398957537040)	LWPOLYLINE	435	{247611b4-a46a-407c-b383-5b37ad525c20}	ESRI_utility	-5
(2398957536928)	GROUP	434	{67a90c54-e48e-4698-bf5c-17da88111ff5}	LINE_ELEC	-5
(2398957536752)	LWPOLYLINE	432	{05c18dca-bef5-493d-9dff-7306b3c163d4}	ESRI_utility	-5
(2398957536640)	LWPOLYLINE	431	{b192806f-17d4-4bcc-aeb4-b3dee742e929}	ESRI_utility	-5
(2398957536528)	LWPOLYLINE	429	{ccb7bcd7-92f2-421b-a96a-494a39fcaa1c}	ESRI_utility	-5
(2398957536416)	LWPOLYLINE	426	{3afdffb93-4cde-4237-b4a9-29a1b423e94c}	ESRI_utility	-5
(2398957536304)	LWPOLYLINE	423	{f92db17d-e4e2-4403-99d1-e1262e2f363}	ESRI_utility	-5
(2398957536192)	LWPOLYLINE	420	{5c97a71e-44f0-4e09-88a3-ffe79855388a}	ESRI_utility	-5
(2398957536080)	LWPOLYLINE	417	{c58cf0e1-912e-4ec5-97da-995efcd02462}	ESRI_utility	-5

From the ArcGIS Online repository, we will add in all other geospatial layers to complete the 'As Built' environment for this location, including **Planning Applications** and **Areas of Vegetation**.

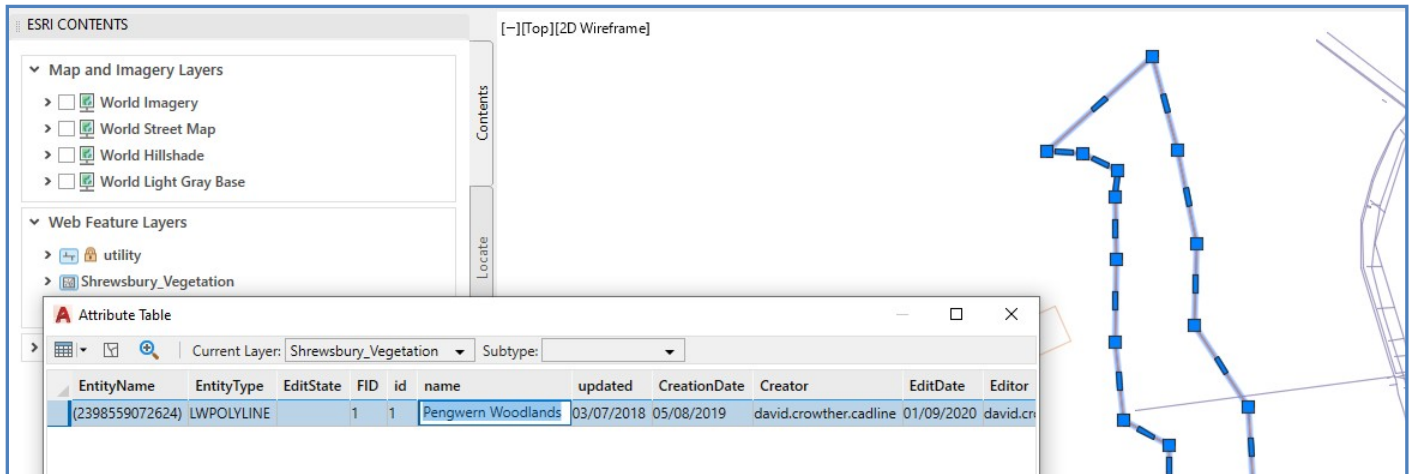


Before making any changes to the feature layers, if we look in the ESRI Content Pane we can see that two of the Feature Layers are **Read Only** (with a padlock) and one is **editable**. These settings are defined by the Administrator of your ArcGIS Online account and can be changed as required, allowing you to have control over who updates each layer.



In this instance we will edit the **Shrewsbury Vegetation** Layer by making both **attribute** and **geometry** updates.

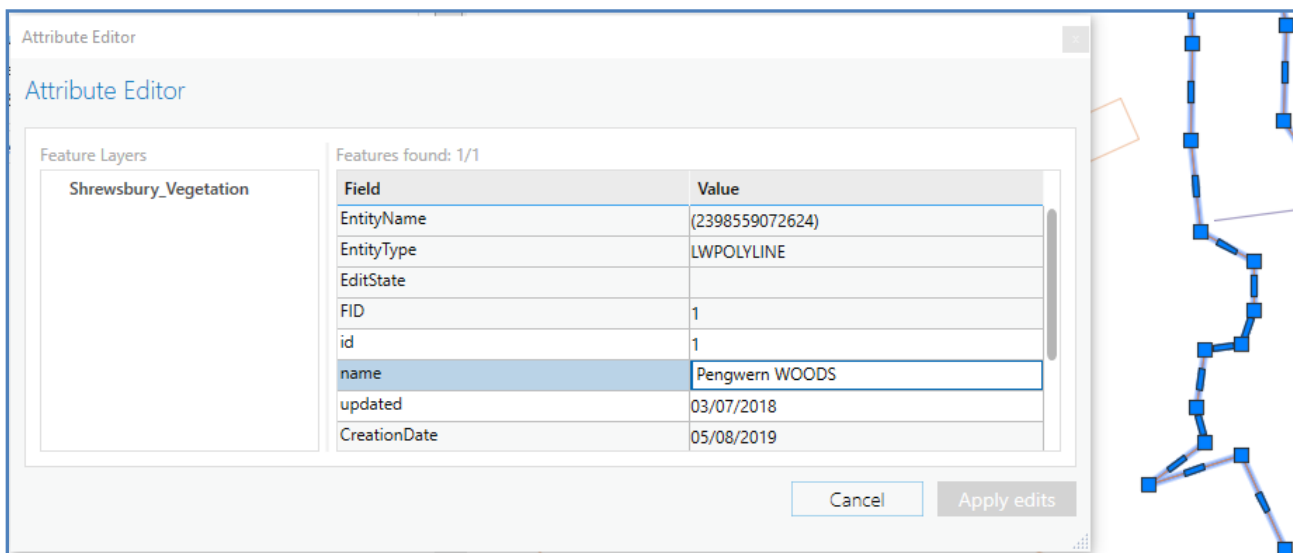
Attributes for Feature Layers can be updated either using the **Attribute Table**.



Or using the **Identify Features** tool and selecting the relevant Vegetation Drawing Object.



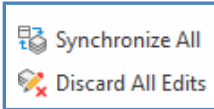
In the **Attribute Editor** window, you can click within the editable cells e.g. **name** and update the values.



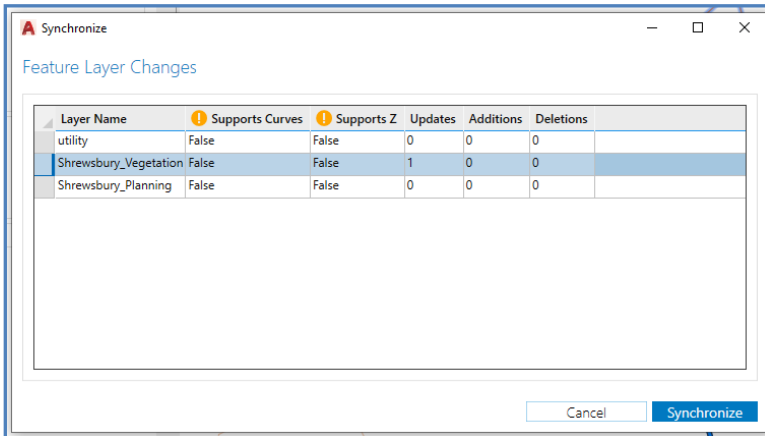
Here we will change the name from Pengwern Woodlands to **Pengwern WOODS**.

Now click away from the cell and choose **Apply Edits**.

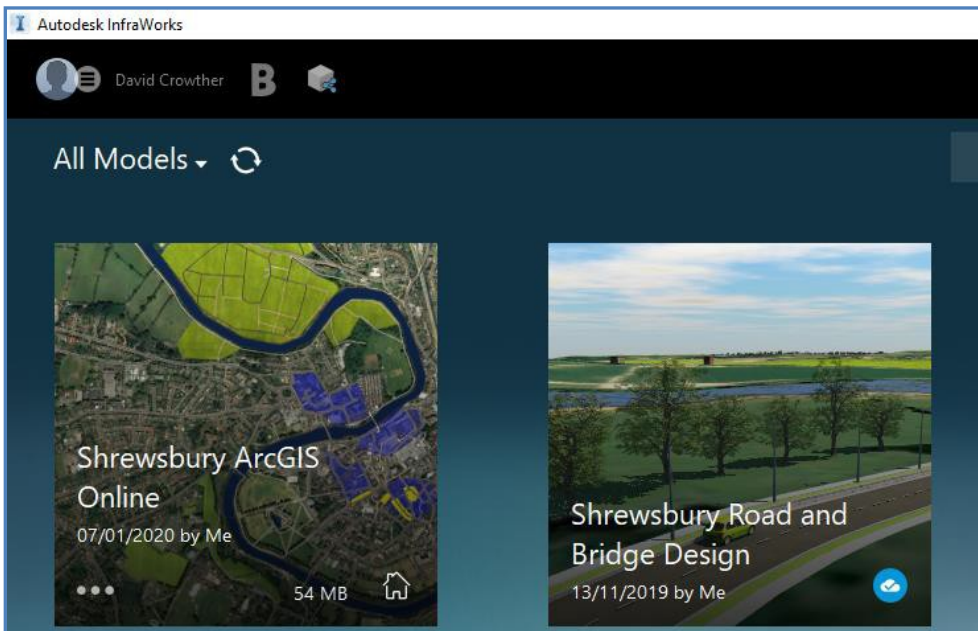
Having made the attribute changes either via the **Attribute Table** or **Identify Features** Tool the updates can be saved back to the source Feature Layers using the **Synchronize All** tool.



Choose the **Feature Layer** to synchronize and press the **Synchronize** button to upload the edits.



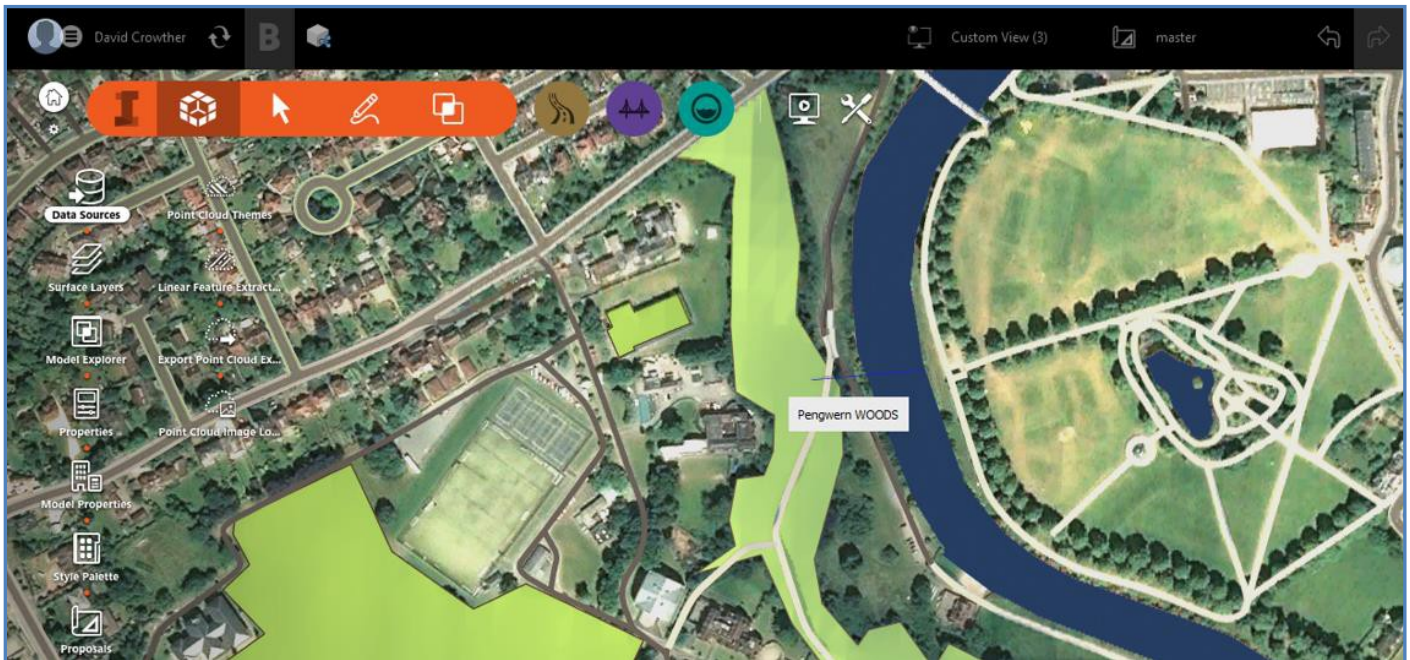
Now within any other application that shares the same data source we will see the changes that were made within AutoCAD. In this instance we have an **InfraWorks Model** with access to the same ArcGIS Online datasets.



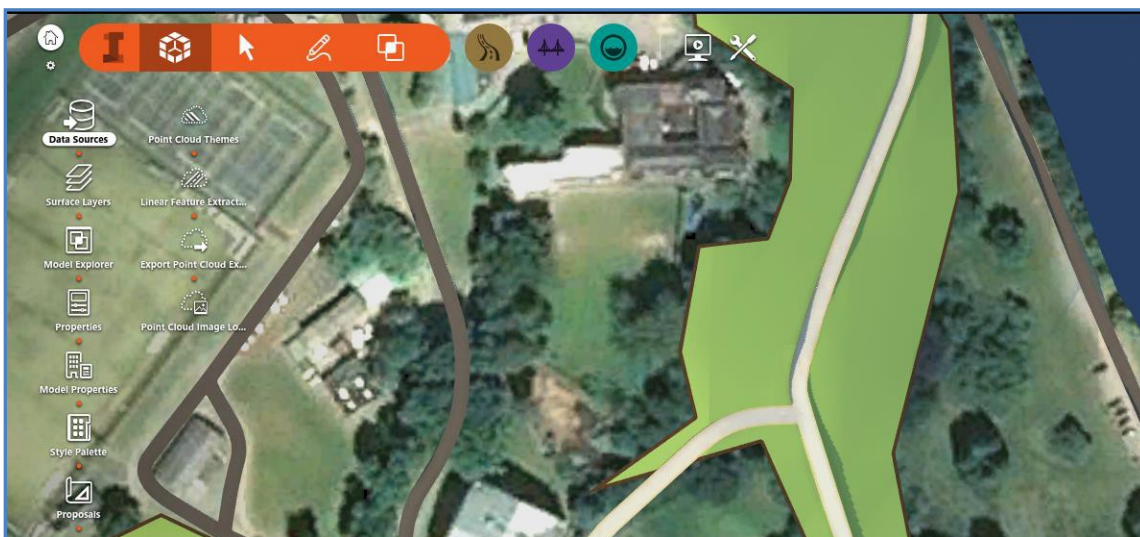
Once we open the Model, in the **DATA SOURCES** pane select the **Vegetation** Layer and choose **Refresh**.



If we now interrogate the same feature, we can see that the attribute for the Vegetation has been updated to reflect the change we made in AutoCAD - **Pengwern WOODS**.



Finally, we will make an edit to the **geometry** within AutoCAD and share this change across our Project team. In this example we need to edit the Vegetation border at the following location where we currently have a spike in the boundary.



Within AutoCAD, with the **World Imagery** Basemap displayed, we can now use the edit tools to **Add, Stretch** and **Remove Vertices** in order to **reshape** the Vegetation boundary.



Once the geometry changes are made in AutoCAD, choose the Synchronize All tool to upload the changes back to the source data within the ArcGIS Online Account.

Layer Name	Supports Curves	Supports Z	Updates	Additions	Deletions
utility	False	False	0	0	0
Shrewsbury_Vegetation	False	False	1	0	0
Shrewsbury_Planning	False	False	0	0	0

Again, now that the source data has been updated within AutoCAD any Project or Model that shares the same source data will also be updated – here is the change refreshed into the **InfraWorks Model**.



ESRI has asked for feedback from this beta release of the ArcGIS to AutoCAD Plugin, and I think there are a number of additions that would make the tool even more powerful including:

- Options for creating Thematic Styling.
- Tools to undertake Spatial Analysis e.g. finding Objects Within, Intersecting, Touching other features.
- Access to non-ArcGIS Online content e.g. Web Map Services (WMS), PostGIS database tables.

The third point is one that, as an Open Source Geospatial expert, I would wish to see implemented as soon as possible. While the plugin goes some way to integrating CAD and GIS teams, there is still a strong reliance on storing spatial data within an ESRI ArcGIS Online environment. We have seen how useful and easy to use the Living Atlas is, however there are many other GIS repositories, such as GeoServer and PostGIS which would ultimately enable even more people to better integrate their CAD and GIS teams.

