

Extended Element Properties

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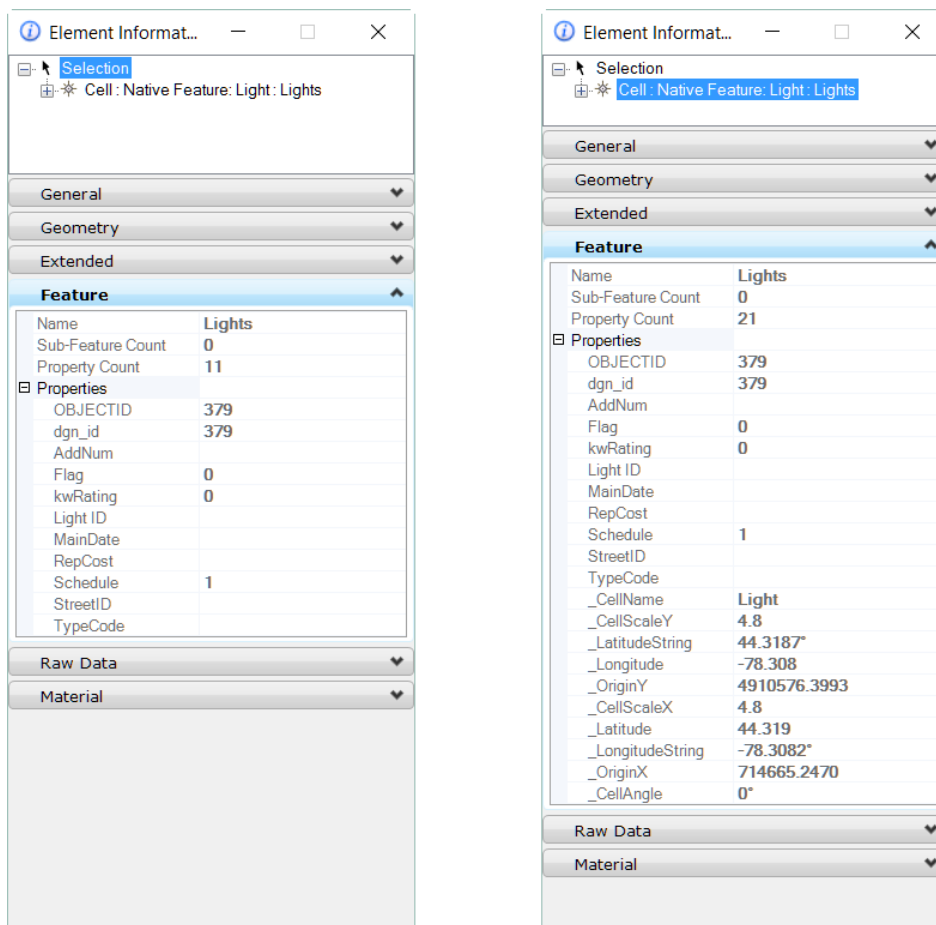
Extended Element Properties

Introduction

The following article discusses the usage and implementation of *xprops.ma*, a custom Bentley Map MDL application that seamlessly extends feature properties to include MicroStation element information such as: *text strings, cell names, cell scales, XY coordinate positions, and latitude/longitude positions.*

The extended properties are exposed in the Element Information dialog, as well as any dialog you find Bentley Map XFM properties. This includes the Data Browser, Interoperability dialog, and several of the Map Manager functions including feature labels, and the search dialog.

The following graphic illustrates the Element Information dialog without *xprops* loaded (left) and the same element with *xprops* loaded (right).



Extended Element Properties

Installation and Configuration

The xprops application is an MDL program provided with this article. Extract and place copies of the DLL and MA files in either the ...*Map\mdlapps* or ...*MicroStation\mdlapps* folder.

If desired the configuration variable MS_GEOINITCMD can be defined to automatically load the MDL when a Bentley Map session is started. This can be done in the Bentley Geospatial Administrator by adding a new entry in the Workspace Macros node:

Macros			
Name	Operator	Value	Comment
MS_DESIGNSEED	=	Seed2d.dgn	Default seed file
GDI_SUPPRESS_SQL_SERVER_QUERY_NON_UNDOABLE_WARNING	=	1	Suppress SQL query warning dialog
MS_GEOXFM_CREATE_ORPHAN_FOR_MISSING_CELLS	=	1	Flag to create orphan cell XML when specified cell is missing
MS_GEOINITCMD	=	MDL SILENTLOAD XPROPS	Automatically load the extended properties application
*			

If you prefer, you can manually start the application using the keyin *mdl load xprops*.

To unload the application, use the keyin *mdl unload xprops*. This keyin may need to be run twice to fully unload the application from your design session.

Once loaded, the following keyins are available:

Keyin	Description
XPROPS VERSION	Displays application build time.
XPROPS ON OFF	Enables or disables extended properties for all feature classes.
XPROPS OFF=MyFeatureClassName	Disables extended properties for specific feature class. For example, to turn off the extended properties for a feature class called <i>Lights</i> , use the keyin <i>xprops off=Lights</i> Note that the feature class name is case sensitive.
XPROPS ON=MyFeatureClassName	Enables extended properties for specific feature class. For example, to turn on the extended properties for a feature class called <i>Lights</i> , use the keyin <i>xprops on=Lights</i> Note that the feature class name is case sensitive.

Extended Element Properties

Geographic Coordinates

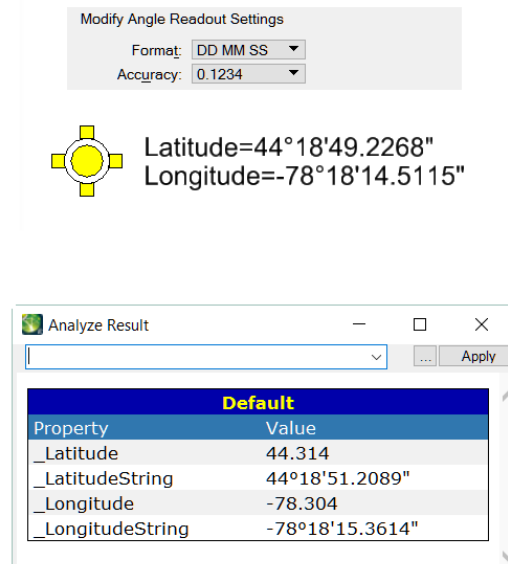
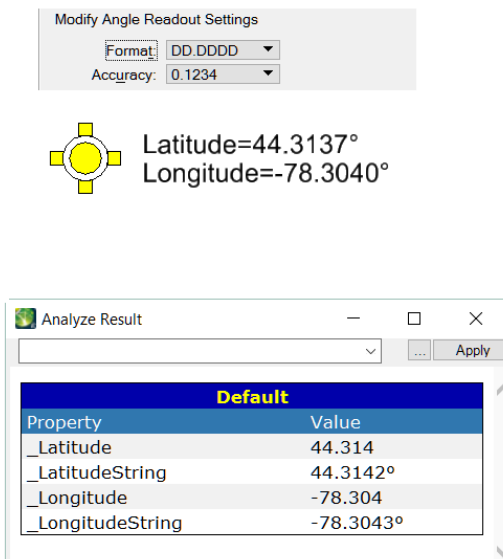
A strength of this application is its ability to recognize the attached Geographic Coordinate System (GCS) and provide you with the latitude and longitude coordinates of your features. The geographic extended properties are described as:

- _Latitude*** The latitude of the point or vertex expressed in decimals.
- _LatitudeString*** The latitude expressed in either decimal degrees or degrees/minutes/seconds.
- _Longitude*** The longitude of the point or vertex expressed in decimals
- _LongitudeString*** The longitude expressed in either decimal degrees or degrees/minutes/seconds

For searching based on geographic locations, use the *_Latitude* and/or *_Longitude* properties.

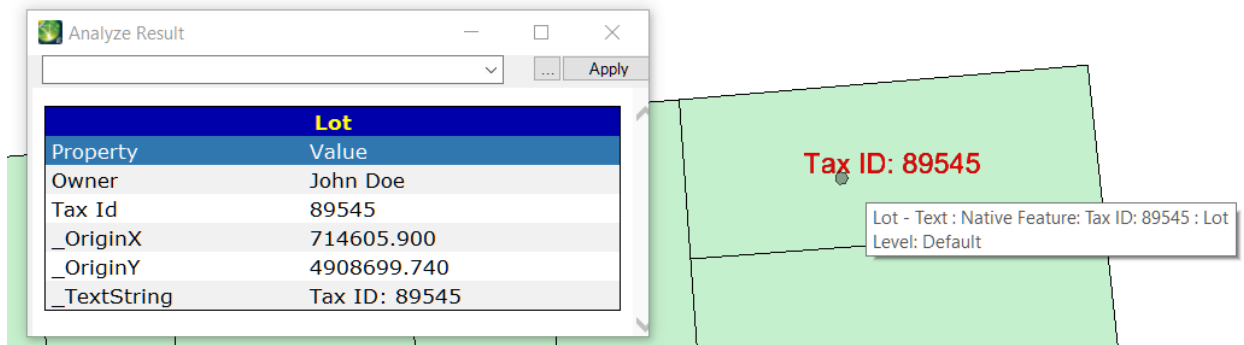
For feature labels and PBA text values, use the string variation which includes the degree symbol.

To control how the string variation is displayed, adjust the design file angle readout to either DD.DDD or DD MM SS. You can find this by navigating to *Settings > Design file > Angle Readout > Format* . Changing the angle format is immediate and reflected when the view is updated or dialog is reopened.



Deleting the GCS from the design file will remove the latitude and longitude extended properties that are made available for use in Bentley Map.

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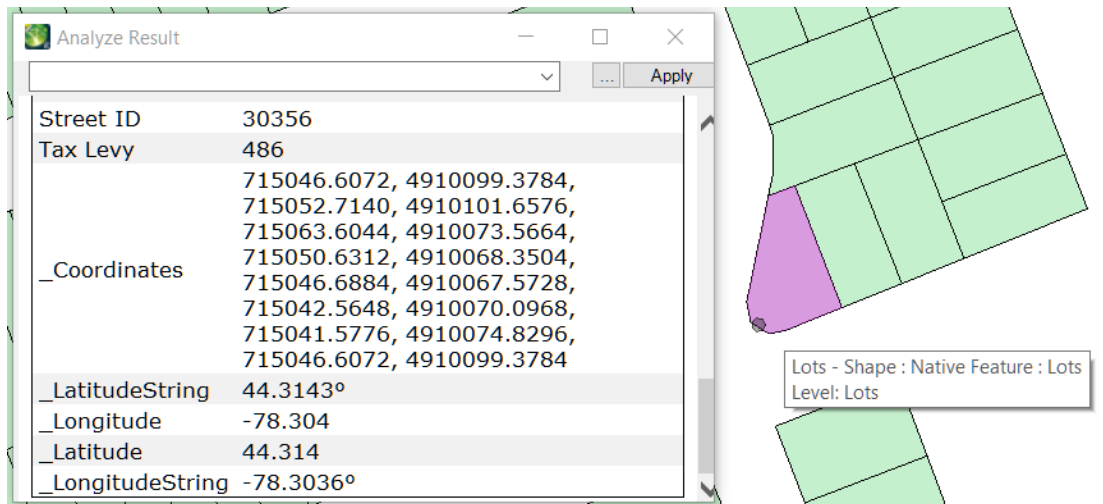


As well, changing the GCS from one to another, may require the design file to be closed and reopened in order to display the new geographic coordinates.

Feature Types

The extended properties will vary for each of the feature types: polygon, line and point.

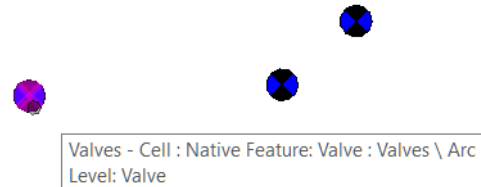
Polygons will show the XY(Z) coordinates of all vertices, and the geographic coordinates of the first vertex.



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The extended properties for Point Cell features includes the cell name, scale, angle in addition to the origin XY(Z) and geographic coordinates.

Valve Type	GATE
Wmain ID	579D1
_CellName	Valve
_CellScaleY	4.800000
_LatitudeString	44.3142°
_Longitude	-78.303
_OriginY	4910096.6452
_CellScaleX	4.800000
_Latitude	44.314
_LongitudeString	-78.3026°
_OriginX	715126.2479
_CellAngle	0°



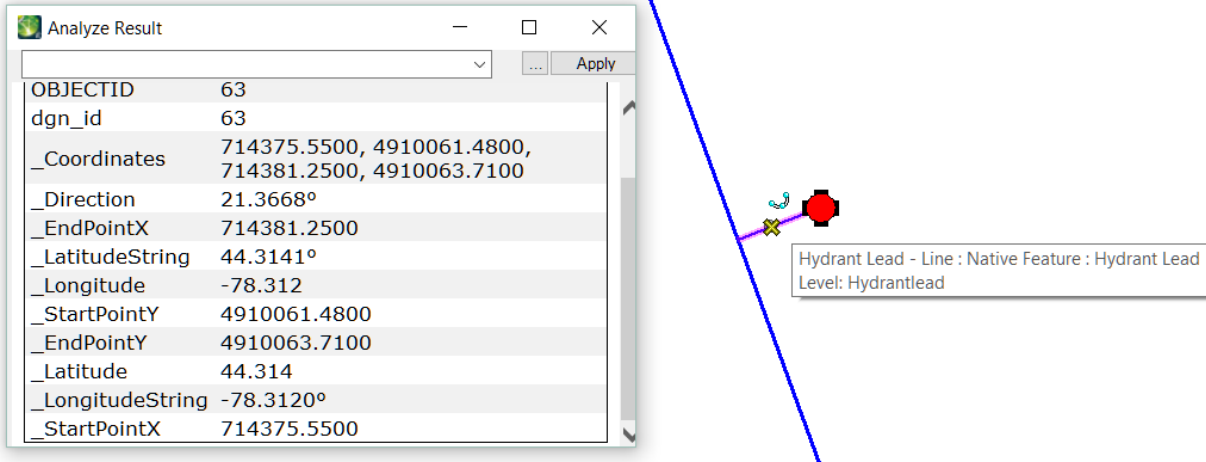
For Point Text features, the text string is returned as well as the origin coordinates. In the graphic below, there is no GCS defined in the file. As a result, the latitude/longitude extended properties are not available for display or use.

Property	Value
Owner	John Doe
Tax Id	89545
_OriginX	714605.900
_OriginY	4908699.740
_TextString	Tax ID: 89545

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For linear features that consist of a single line, you'll find the XY(Z) and geographic coordinates for the start and end points as well as the line direction expressed in degrees.

For line strings, the coordinates for all vertices are returned, and the direction is based on the first segment.



The screenshot shows a software interface with an 'Analyze Result' window on the left and a map view on the right. The window displays the following data:

PROPERTY	VALUE
OBJECTID	63
dgn_id	63
_Coordinates	714375.5500, 4910061.4800, 714381.2500, 4910063.7100
_Direction	21.3668°
_EndPointX	714381.2500
_LatitudeString	44.3141°
_Longitude	-78.312
_StartPointY	4910061.4800
_EndPointY	4910063.7100
_Latitude	44.314
_LongitudeString	-78.3120°
_StartPointX	714375.5500

The map view on the right shows a blue line segment. A tooltip is displayed over the line, containing the text: "Hydrant Lead - Line : Native Feature : Hydrant Lead Level: Hydrantlead".

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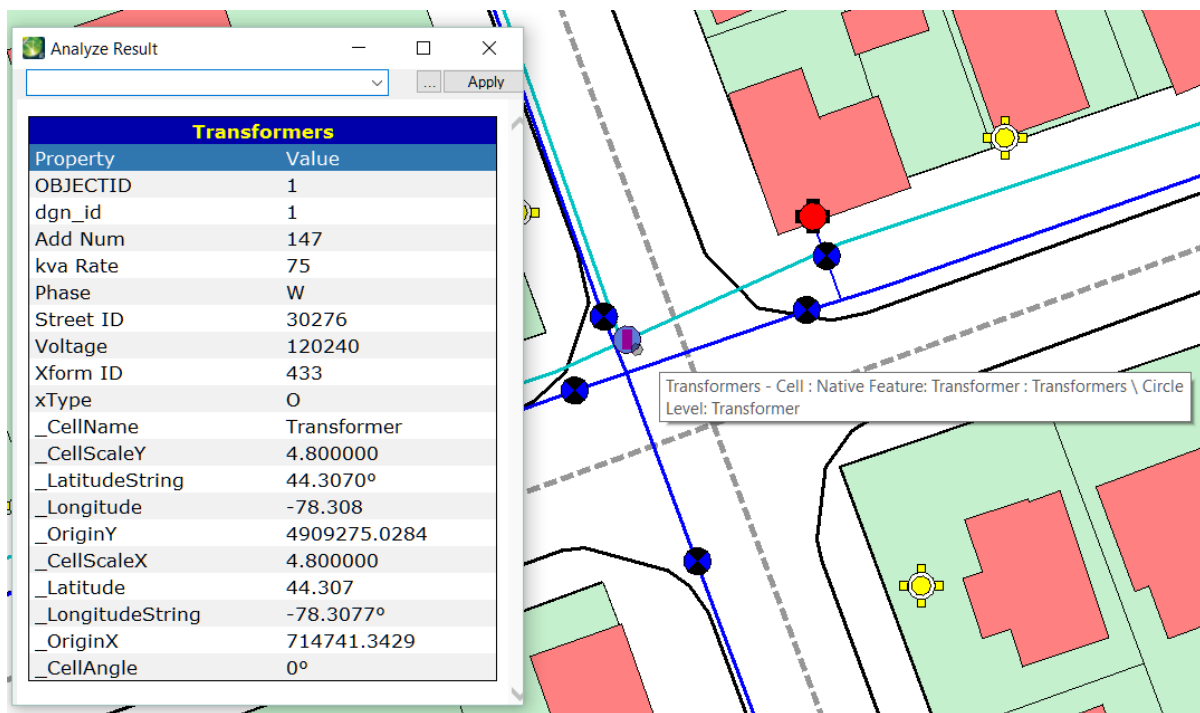
Usage

Xprops seamlessly extends business properties for all Bentley Map session data and does this without changing the element or XMF feature. In addition, since the extended properties are only available when xprops is running, nothing is written to the design file.

The following examples illustrates just some of the usage of xprops in a typical Bentley Map project.

Analyze XFM Feature

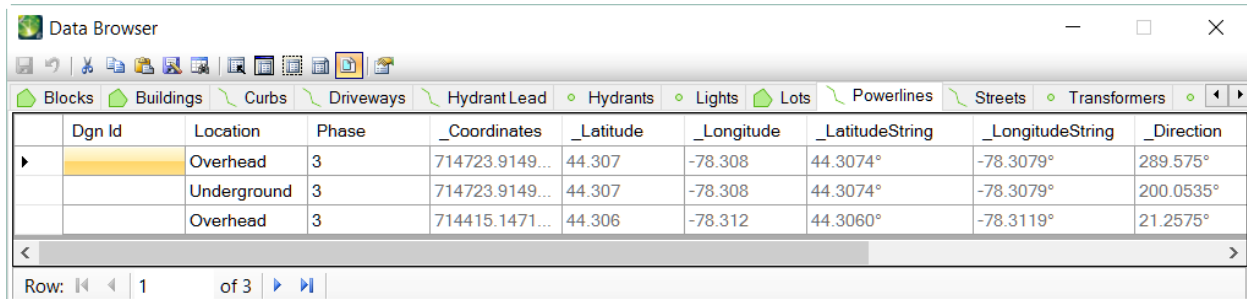
Review a features extended properties with the *Analyze XFM Feature* tool. The properties are easily recognizable by their underscore prefix. Note that the content ordering of the Analyze Result dialog is controlled by *default.xslt*.



Extended Element Properties

Data Browser

When using the Data Browser, the extended properties will appear to the right of the XFM properties and are read only.



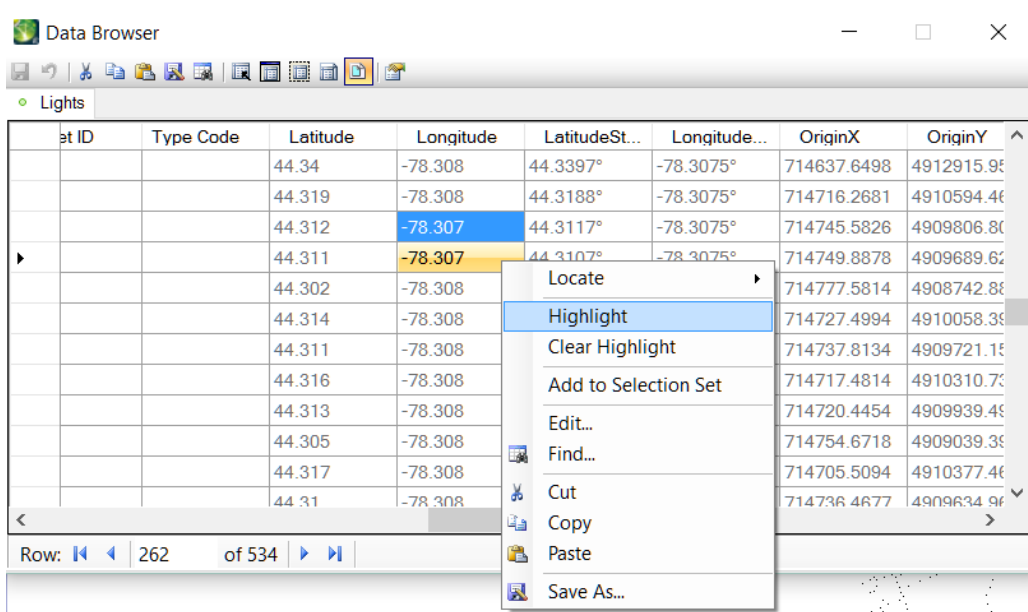
The screenshot shows the Data Browser window with a table of powerline data. The table has columns for Dgn Id, Location, Phase, _Coordinates, _Latitude, _Longitude, _LatitudeString, _LongitudeString, and _Direction. The first row is highlighted in yellow.

Dgn Id	Location	Phase	_Coordinates	_Latitude	_Longitude	_LatitudeString	_LongitudeString	_Direction
	Overhead	3	714723.9149...	44.307	-78.308	44.3074°	-78.3079°	289.575°
	Underground	3	714723.9149...	44.307	-78.308	44.3074°	-78.3079°	200.0535°
	Overhead	3	714415.1471...	44.306	-78.312	44.3060°	-78.3119°	21.2575°

Once loaded, you can use any of the Data Browser tools to refine the display of the rows.

For example:

- Order the content based on the size, name or angle of the cell.
- Sort the data by their latitude/longitude values in order to locate or highlight features based on their geographic location.
- Perform finds on specific values, copy values to insert into other applications for further analysis.
- And even add features to a MicroStation selection set based on their extended properties.



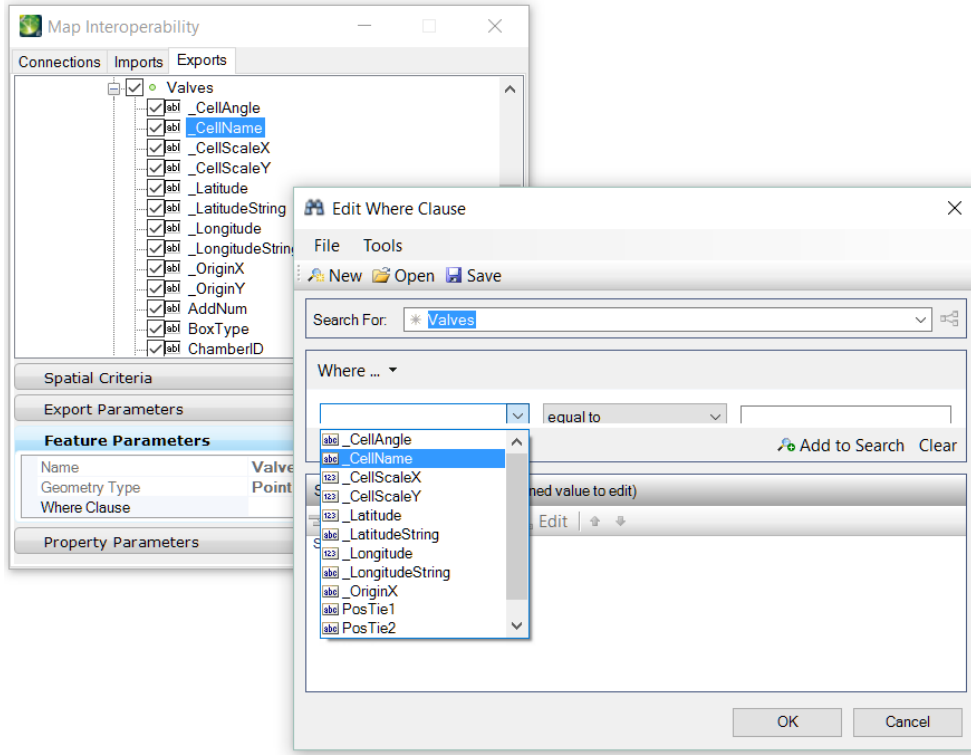
The screenshot shows the Data Browser window with a table of light data. A context menu is open over the table, highlighting the 'Highlight' option. The table has columns for Object ID, Type Code, Latitude, Longitude, LatitudeSt..., Longitude..., OriginX, and OriginY.

Object ID	Type Code	Latitude	Longitude	LatitudeSt...	Longitude...	OriginX	OriginY
		44.34	-78.308	44.3397°	-78.3075°	714637.6498	4912915.95
		44.319	-78.308	44.3188°	-78.3075°	714716.2681	4910594.46
		44.312	-78.307	44.3117°	-78.3075°	714745.5826	4909806.80
		44.311	-78.307	44.3107°	-78.3075°	714749.8878	4909689.62
		44.302	-78.308			714777.5814	4908742.88
		44.314	-78.308			714727.4994	4910058.38
		44.311	-78.308			714737.8134	4909721.18
		44.316	-78.308			714717.4814	4910310.73
		44.313	-78.308			714720.4454	4909939.48
		44.305	-78.308			714754.6718	4909039.38
		44.317	-78.308			714705.5094	4910377.46
		44.31	-78.308			714736.4677	4909634.96

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Map Interoperability


Create a Where Clause when exporting features to another GIS format such as shapefiles.



Property Based Annotation (PBA)

Knowing that the extended properties can be used anywhere you would also use XFM properties, incorporate them into your schema for generating Property Based Annotation.

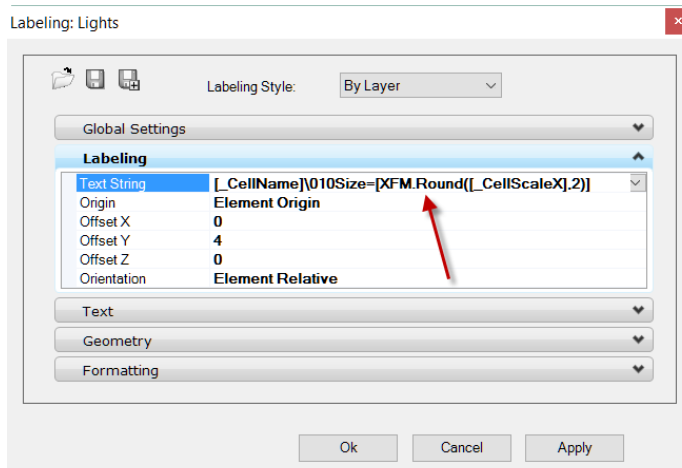
Key	Value
Scale	0.001
Apply Drawing Scale	<input checked="" type="checkbox"/>
Apply Scale On Edit	<input checked="" type="checkbox"/>
Override Scale	
Color	0
Level	LightsText
Style	
Style Scale	1
Weight	0
Line Spacing	0.25
Text Style	Notes
Class	Primary
Priority	0
Transparency	0
PBA	LAT=[_LatitudeString]010LONG=[_LongitudeString]

 LAT=44.3199°
LONG=-78.3045°

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Labeling

The extended properties are available in the Map Manager Labeling dialog as well. In this example, the name of the cell and size is being labeled. Note the use of `[XFM.Round([property]).2]` to round up the scale value.



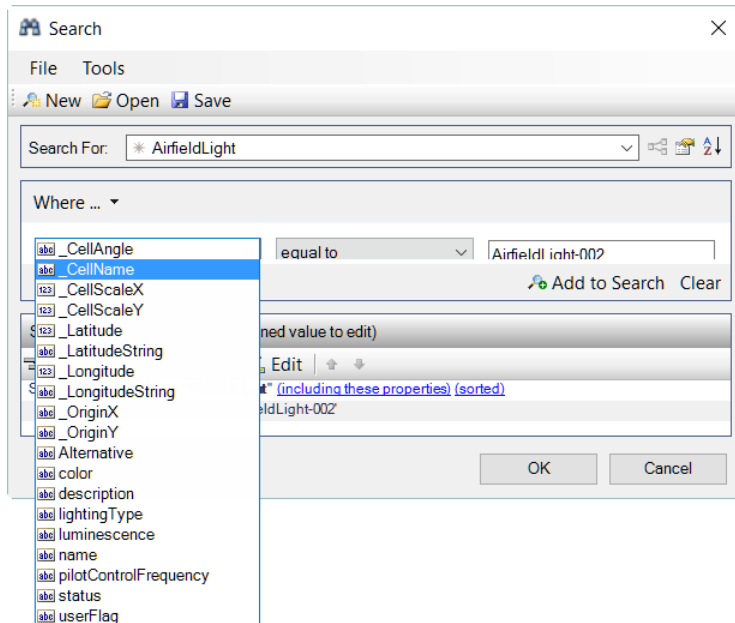
Property	Value
_CellName	Light
_CellScaleY	4.800000
_LatitudeString	44.3210°
_Longitude	-78.311
_OriginY	4910822.9578
_CellScaleX	4.800000



Searching

Searching on the extended properties is no different than searching on XFM properties. When searching on longitude or geographic values, use `_Latitude` or `_Longitude`. This eliminates the need to enter a degree symbol when searching on `_LatitudeString` and `_LongitudeString`.

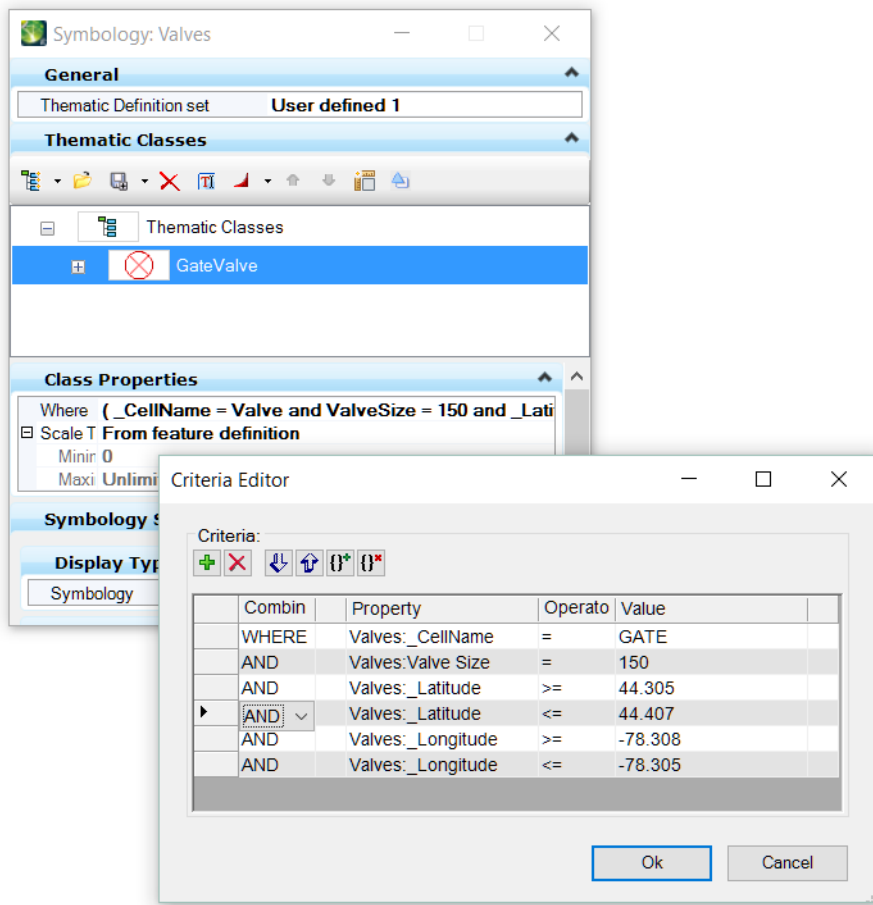
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Thematic Resymbolization

When it comes to resymbolizing your map based on properties, the xprop application provides a number of advantages. For example, you can now resymbolize point cell features based the cell name as well as the geographic location. The ability to create search criteria with both XFM and extended properties allows an infinite number of Map Manager resymbolizing strategies.

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