



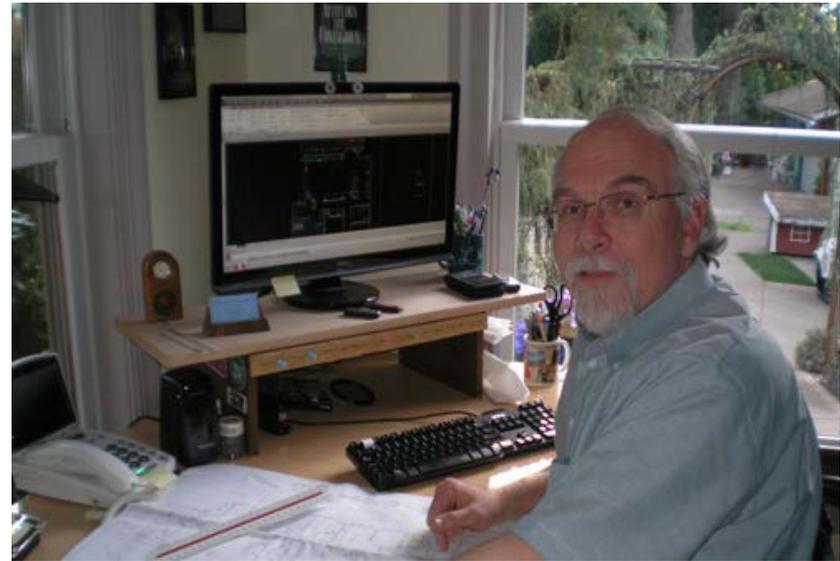
# RI GIS USERS GROUP MEETING

December 01, 2016

## Bringing GIS Into the Design World and Back Again

Presented by: Deb Landi

Proactive By Design.  
Our Company Commitment



## Multiple Options for getting GIS data into CAD

- From GIS - Export GIS features to CAD entities
- From CAD - Import GIS Shapefiles using “Mapimport”
- From CAD - Connect to GIS data using “Data Connect”
- From CAD - Connect to GIS data using ArcGIS for CAD Plug-in

# Export features from GIS to CAD

The screenshot shows the ArcGIS Desktop interface with the 'Export to CAD' dialog box open. The main map area displays a land use map with various colored polygons representing different land use types. The 'Table Of Contents' on the left lists the layers, with 'All Land Use' selected. The 'Export to CAD' dialog box has the following settings:

- Input Features:** A list containing 'All Land Use', 'BUILDING FOOTPRINT', 'Approx\_FormerMGPBoundary', and 'RI\_Parcels'. The 'All Land Use' layer is selected.
- Output Type:** DWG\_R2013
- Output File:** C:\Users\Deborah.Landi\Desktop\GIS\Face University\Week 11\rgis\CAD\_GIS.DWG
- Ignore Paths in Tables (optional)
- Append to Existing Files (optional)
- Seed File (optional):** (Empty field)

Buttons at the bottom of the dialog include 'OK', 'Cancel', 'Environments...', and '<< Hide Help'.

# Export features from GIS to CAD – Resulting CAD file

The screenshot shows the AutoCAD interface with the Layer Properties Manager and Polyline Properties palette open over a GIS export of a site plan.

**Layer Properties Manager Table:**

Status	Name	On	Fr...	Lock	Color	Linetype	Lineweight	Transparency
✓	0	☑	☀	🔒	white	Continuous	Default	0
✓	A-RI PARCELS	☑	☀	🔒	85,255,0	Continuous	Default	0
✓	All Land Use	☑	☀	🔒	white	Continuous	Default	0
✓	BUILDING FOOTPRINT	☑	☀	🔒	white	Continuous	Default	0
✓	CURRENT PROPERTY BOUNDARY	☑	☀	🔒	255,170,0	Continuous	0.60...	0

**Polyline Properties Table:**

General	
Color	<input type="checkbox"/> ByLayer
Layer	All Land Use
Linetype	ByLayer
Linetype scale	1.0000
Plot style	ByColor
Lineweight	ByLayer
Transparency	ByLayer
Hyperlink	
Thickness	0.0000
3D Visualization	
Geometry	
Current Vertex	1
Vertex X	635219.4582
Vertex Y	673259.9368
Start segment width	0.0000
End segment width	0.0000
Global width	0.0000
Elevation	0.0000
Area	10114.7422
Length	402.2938
Misc	
Closed	Yes
Linetype generation	Disabled

# Import GIS Shapefiles into CAD using Mapimport

The screenshot displays the AutoCAD Mapimport interface with three dialog boxes open:

- Import - J:\Geo\34060.mjp\Parcel.shp**: Shows the current drawing coordinate system as NY83-EF (NAD83 New York State Planes, East Zone, US Foot). It includes a table for import properties for each layer.
- Object Data Mapping**: A list of input fields from the shapefile mapped to target fields in the CAD database.
- Attribute Data**: Options to import attribute data, with 'Create object data' selected and 'LandUse\_All' chosen as the table to use.

Input Layer	Drawing Layer	Object Class	Input Coordinate	Data	Points
<input checked="" type="checkbox"/> bldg_OL	bldg_OL	<None>	NY83-EF	bldg_OL	<ACAD_POINT>
<input checked="" type="checkbox"/> LandUse_All	LandUse_All	<None>	NY83-EF	LandUse_All	<ACAD_POINT>
<input checked="" type="checkbox"/> MGP_Boundary	MGP_Boundary	<None>	NY83-EF	MGP_Boundar	<ACAD_POINT>
<input checked="" type="checkbox"/> Parcel	Parcel	<None>	NY83-EF	Parcel	<ACAD_POINT>

Input Fields	Target Fields
<input checked="" type="checkbox"/> FeatId	FeatId
<input checked="" type="checkbox"/> OBJECTID	OBJECTID
<input checked="" type="checkbox"/> Borough	Borough
<input checked="" type="checkbox"/> Block	Block
<input checked="" type="checkbox"/> Lot	Lot
<input checked="" type="checkbox"/> CD	CD
<input checked="" type="checkbox"/> CT2000	CT2000
<input checked="" type="checkbox"/> CB2000	CB2000
<input checked="" type="checkbox"/> SchoolDist	SchoolDist
<input checked="" type="checkbox"/> Council	Council
<input checked="" type="checkbox"/> ZipCode	ZipCode
<input checked="" type="checkbox"/> FireComp	FireComp
<input checked="" type="checkbox"/> HealthArea	HealthArea
<input checked="" type="checkbox"/> HealthCtr	HealthCtr
<input checked="" type="checkbox"/> PolicePrct	PolicePrct
<input checked="" type="checkbox"/> Address	Address
<input checked="" type="checkbox"/> ZoneDist1	ZoneDist1
<input checked="" type="checkbox"/> ZoneDist2	ZoneDist2
<input checked="" type="checkbox"/> ZoneDist3	ZoneDist3
<input checked="" type="checkbox"/> ZoneDist4	ZoneDist4
<input checked="" type="checkbox"/> Overlay1	Overlay1
<input checked="" type="checkbox"/> Overlay2	Overlay2
<input checked="" type="checkbox"/> SPDist1	SPDist1
<input checked="" type="checkbox"/> SPDist2	SPDist2
<input checked="" type="checkbox"/> AllZoning1	AllZoning1
<input checked="" type="checkbox"/> AllZoning2	AllZoning2
<input checked="" type="checkbox"/> SplitZone	SplitZone
<input checked="" type="checkbox"/> BldgClass	BldgClass
<input checked="" type="checkbox"/> LandUse	LandUse
<input checked="" type="checkbox"/> Easements	Easements
<input checked="" type="checkbox"/> OwnerType	OwnerType

# Each features become a CAD object with data attached.

The screenshot displays the Autodesk AutoCAD Civil 3D 2016 interface. The main workspace shows a map layout with a blue polygon selected. The 'Properties' palette on the right shows the 'Polyline' object's properties, including general settings, 3D visualization, geometry, and miscellaneous data. The 'Layer Properties Manager' is also visible, showing the current layer settings.

**Properties Palette - Polyline**

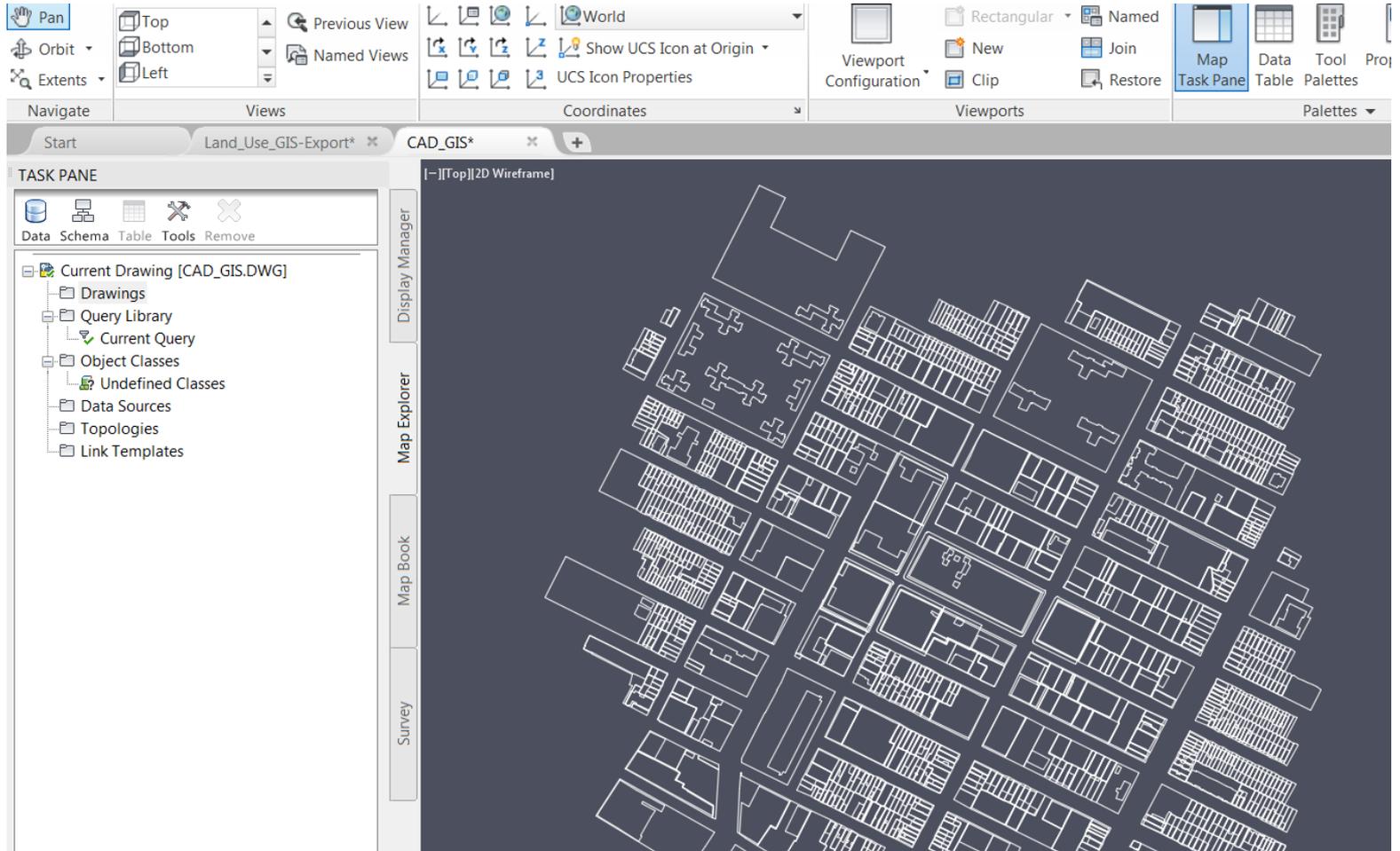
- General**
  - Color: ByLayer
  - Layer: LandUse\_All
  - Linetype: ByLayer
  - Linetype scale: 1.0000
  - Plot style: ByColor
  - Lineweight: ByLayer
  - Transparency: ByLayer
  - Hyperlink:
  - Thickness: 0.0000
- 3D Visualization**
- Geometry**
  - Current Vertex: 1
  - Vertex X: 635618.6550
  - Vertex Y: 674045.8980
  - Start segment width: 0.0000
  - End segment width: 0.0000
  - Global width: 0.0000
  - Elevation: 0.0000
  - Area: 243595.6812
  - Length: 1982.1611
- Misc**
  - Closed: Yes
  - Linetype generation: Disabled
- OD:LandUse\_All**
  - FeatId: 845
  - OBJECTID: 845
  - Borough: BK
  - Block: 394
  - Lot: 1
  - CD: 306
  - CT2000: 127
  - CB2000: 2001
  - SchoolDist: 15
  - Council: 33
  - ZipCode: 11217
  - FireComp: E226
  - HealthArea: 2600
  - HealthCtr: 38
  - PolicePrct: 78
  - Address: 120 3 AVENUE
  - ZoneDist1: R6
  - ZoneDist2:
  - ZoneDist3:
  - ZoneDist4:

**Layer Properties Manager**

Status	Name	On	Fr...	Lock	Color	Linetype	Lineweight
✓	0	☑	☀	🔒	white	Continuous	Default
✓	A-RI PARCELS	☑	☀	🔒	85,255,0	Continuous	Default
✓	bldg_OL	☑	☀	🔒	white	Continuous	Default
✓	CURRENT PROPERTY BOUNDARY	☑	☀	🔒	255,170,0	Continuous	0.60...
✓	LandUse_All	☑	☀	🔒	white	Continuous	Default
✓	MGP_Boundary	☑	☀	🔒	white	Continuous	Default
✓	Parcel	☑	☀	🔒	white	Continuous	Default

Command: Specify opposite corner or [Fence/WPolygon/CPolygon]:

# Use the Query function in CAD to isolate features by data



# Connect to GIS data using Map 3D "Data Connect"

The screenshot shows the AutoCAD Civil 3D 2016 interface with the Data Connect tool open. The tool is displaying a list of data connections and a table of data for the selected connection.

**Data Connections by Provider:**

- Add ArcSDE Connection
- Add Enterprise Industry Model Co
- Add MySQL Connection
- Add ODBC Connection
- Add Oracle Connection
- Add PostgreSQL Connection
- Add Raster Image or Surface Con
- Add SDF Connection
- Add SHP Connection
- SHP\_1
  - bldg\_OL
- Add SQL Server Spatial Connecti
- Add SQLite Connection
- Add WFS Connection
- Add WMS Connection

**SHP Feature Class:** bldg\_OL (J:\Geo\34060 mjp\Figures\GIS\SHP\RI\_Land\_Use\bldg\_OL.shp)

**Source Settings:** This data is added to the map as a layer.

**Schema:** Coordinate System

- Default
  - bldg\_OL NY83-EF

**Map Coordinate System:** NY83-EF, NAD83 New York State Planes, East Zone, US Foot, Foot

**Data Table:**

Featid	OBJECTID_1	OBJECTID	BIN	Shape_Leng	Shape_Le_1	Shape_Area
203	203	271655	3006389	399.803756...	399.773548...	9987.05192...
204	204	273378	3007376	519.141288...	519.101784...	15581.1879...
205	205	273569	3019531	111.981879...	111.973395...	640.629470...
206	206	273912	3006785	280.222573...	280.201217...	2005.07687...
207	207	276788	3345393	87.5480208...	87.5413502...	461.024654...
208	208	277186	3019182	129.663082...	129.653276...	895.361717...
209	209	278693	3007493	118.583840...	118.574804...	758.282751...
210	210	278862	3000000	217.263436...	217.246936...	1564.52771...

Row 203 of 829 | 1 Selected | Search to Select | Options

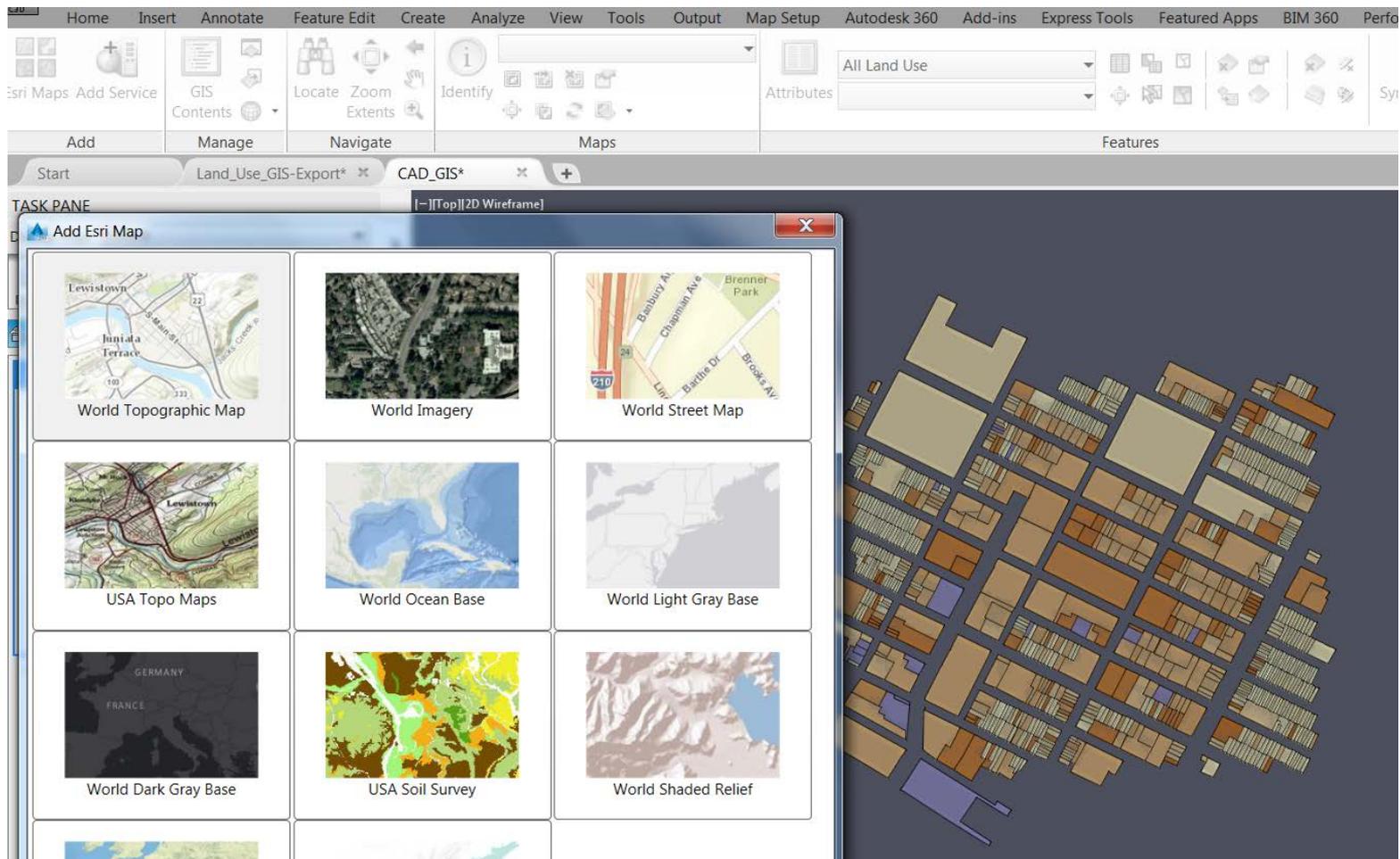
# GIS data can be symbolized and analyzed

The screenshot displays the ArcGIS desktop environment. The ribbon at the top includes tabs for Home, Insert, Annotate, Feature Edit, Create, Analyze, View, Tools, Output, Map Setup, Autodesk 360, Add-ins, Express Tools, and Featured A. The Home ribbon is active, showing tools like 'Zoom to Extents', 'Query to Filter', 'Search to Select', 'Feature Selectable', 'Table', 'Label to Text', 'Check Out', 'Check In', 'New Feature', 'COGO', 'Joins', 'Calculations', 'Move', and 'Modify'.

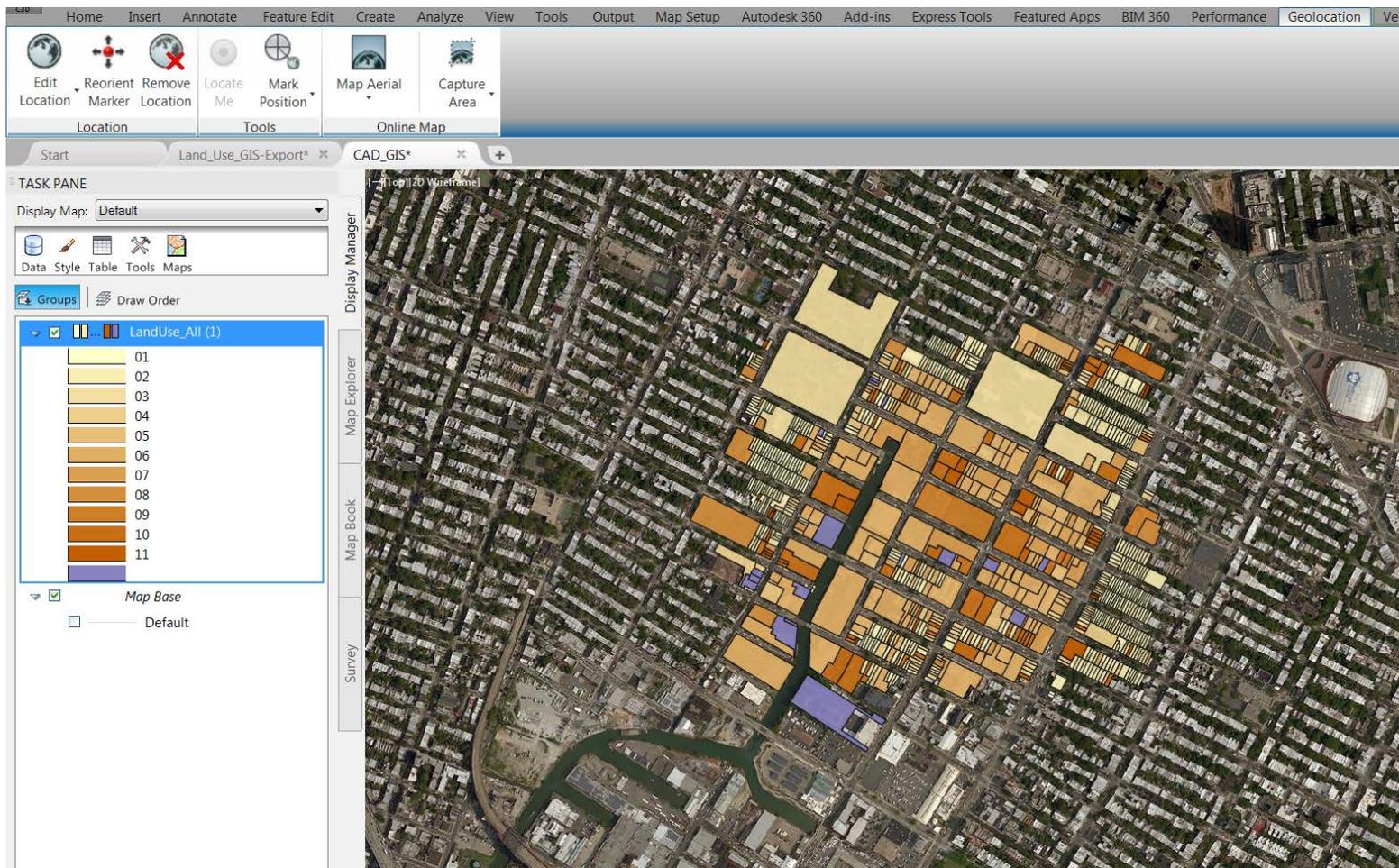
The TASK PANE on the left shows the 'Display Map' dropdown set to 'Default'. Below it are icons for Data, Style, Table, Tools, and Maps. The 'Groups' section is expanded to show 'LandUse\_All (1)' with a legend for 11 land use categories (01-11) represented by a color gradient from light yellow to dark brown. A 'Map Base' section is also visible with a 'Default' symbol.

The main map area shows a 2D wireframe view of a city street grid with various land use parcels colored according to the legend. The map title bar indicates '[---][Top][2D Wireframe]'. On the right side of the map, there are vertical toolbars for 'Display Manager', 'Map Explorer', 'Map Book', and 'Survey'.

# Connect to GIS data with ArcGIS for CAD Plug-in



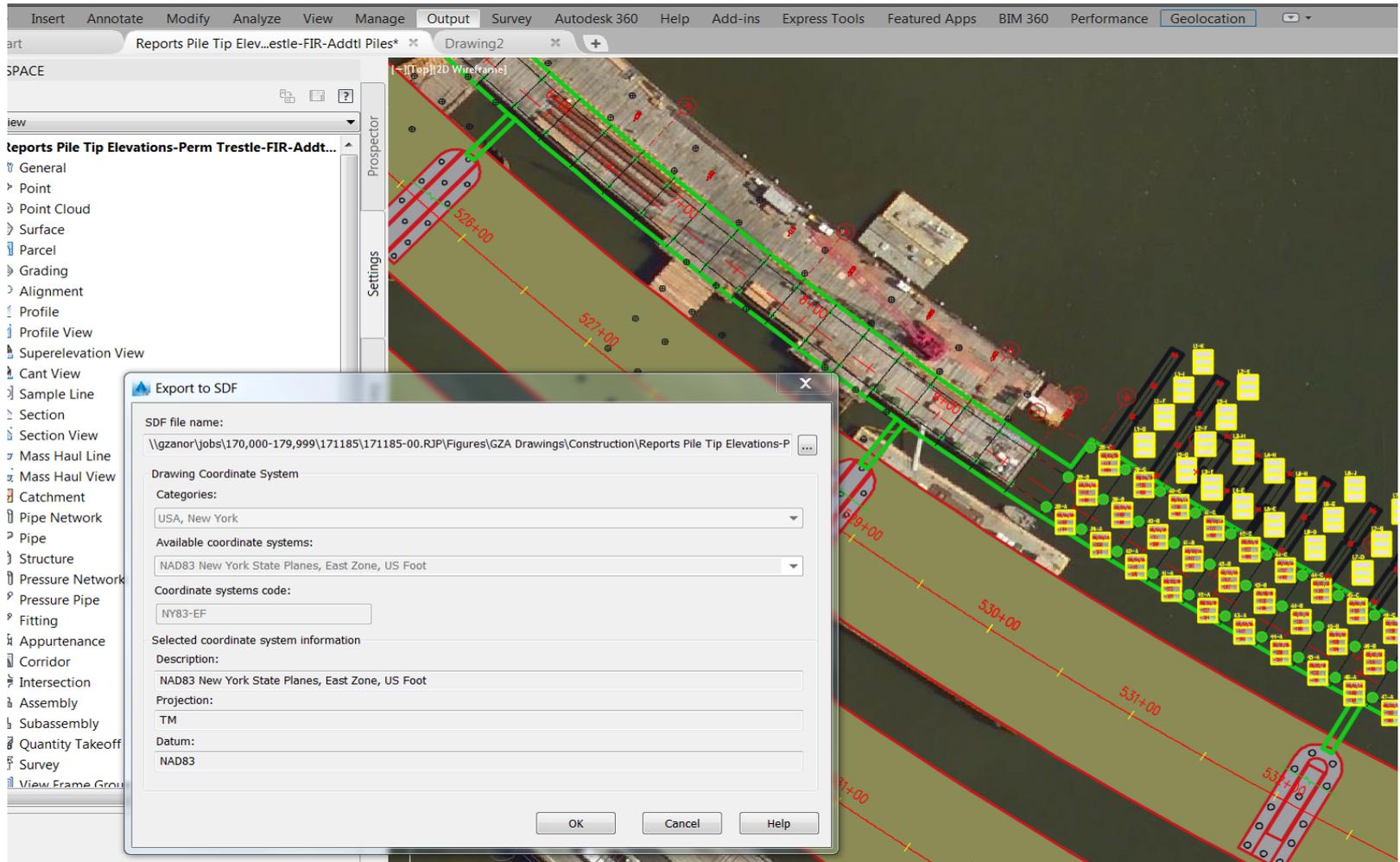
# Connect to Bing Maps using the Geolocation Tool in CAD



## Multiple Options for getting CAD data into GIS

- From CAD - Export 3D Objects to shapefiles
- From CAD - Export AutoCAD points, lines, polygons and text to shapefiles
- From ArcMap - Connect to DWG (ArcMap 10 or higher) and import AutoCAD points, lines, polygons and text

# Export 3D Objects to shapefiles – It's a multi-step process



# Export to SDF

The screenshot displays the 'Import' dialog box in AutoCAD, showing the current drawing coordinate system as NY83-EF (NAD83 New York State Planes, East Zone, US Foot). The 'Import properties for each layer imported' table is as follows:

Input Layer	Drawing Layer	Object Class	Input Coordinate	Data	Points
<input type="checkbox"/> Alignments	Alignments	<None>	NY83-EF	<None>	<ACAD_POINT>
<input type="checkbox"/> Parcels	Parcels	<None>	NY83-EF	<None>	<ACAD_POINT>
<input type="checkbox"/> Pipes	Pipes	<None>	NY83-EF	<None>	<ACAD_POINT>
<input checked="" type="checkbox"/> Points	Points	<None>	NY83-EF	<None>	<ACAD_POINT>
<input type="checkbox"/> Structures	Structures	<None>	NY83-EF	<None>	<ACAD_POINT>

The 'Object Data Mapping' dialog shows the following mapping:

Input Fields	Target Fields
<input checked="" type="checkbox"/> Autogenerated_SDF_ID	Autogenerated_SDF_ID
<input checked="" type="checkbox"/> Name	Name
<input checked="" type="checkbox"/> Description	Description
<input checked="" type="checkbox"/> RawDescription	RawDescription
<input checked="" type="checkbox"/> Number	Number
<input checked="" type="checkbox"/> Elevation	Elevation
<input checked="" type="checkbox"/> Latitude	Latitude
<input checked="" type="checkbox"/> Longitude	Longitude

The 'Attribute Data' dialog is set to 'Create object data' with 'Points' selected as the 'Object Data table to use'. The 'Import Location' dialog shows the file 'Pile.sdf' selected in the 'RIGIS' folder, with the file type set to 'Autodesk SDF (\*.sdf)'.

# Import SDF into a new DWG as AutoCAD points

The screenshot shows the AutoCAD interface with a 3D visualization of a construction site. A grid of white circular points is overlaid on the right side of the model. The Properties palette is open on the right, displaying the following settings for the selected point object:

Color	<input type="checkbox"/> ByLayer
Layer	C-ANNO-MATC-PATT
Linetype	ByLayer
Linetype scale	1.0000
Lineweight	ByLayer
Transparency	ByLayer
Thickness	0.0000
<b>3D Visualization</b>	
<b>Plot style</b>	
Plot style	ByColor
Plot style table	None
Plot table attached to	Model
Plot table type	Not available
<b>View</b>	
Center X	653007.8070
Center Y	816243.5496
Center Z	0.0000
Height	493.2053
Width	963.6940
<b>Misc</b>	
Annotation scale	1" = 40'
UCS icon On	Yes
UCS icon at origin	No
UCS per viewport	Yes
*UCS Name	*TOP*
Visual Style	2D Wireframe

Command: \_properties  
Command: P\_PATT

# Export points to shapefiles

The screenshot displays the 'Export - C:\Users\...\piles.shp' dialog box with the 'Selection' tab active. The 'Object type' section has 'Point' selected. Under 'Select objects to export', 'Select all' is chosen. The 'Filter selection' section includes 'Layers' and 'Object Classes' fields. The 'Select polygon topology to export' section has 'Name' set to '<None>' and 'Group complex polygons' unchecked. The 'Saved profiles' section has 'Load...' and 'Save...' buttons. The 'Select Attributes...' sub-dialog is open, showing a tree view with 'Points' selected and expanded. The following attributes are checked: Autogenerated\_SDF\_ID, Name, Description, RawDescription, Number, Elevation, Latitude, and Longitude. The 'Object Properties' folder is also visible.

**Export - C:\Users\...\piles.shp**

Selection | Data | Options

Object type

Point  Line  Polygon  Text

Select objects to export

Select all  Select manually

Filter selection

Layers: \*

Object Classes: \*

Select polygon topology to export

Name: <None>

Group complex polygons

Saved profiles

Load... Save... Current profile:

OK Cancel Help

Automatic selection

**Select Attributes**

Expression:

- Properties
  - Object Data
    - Points
      - Autogenerated\_SDF\_ID
      - Name
      - Description
      - RawDescription
      - Number
      - Elevation
      - Latitude
      - Longitude
    - Object Properties

OK Cancel Help

Automatic selection

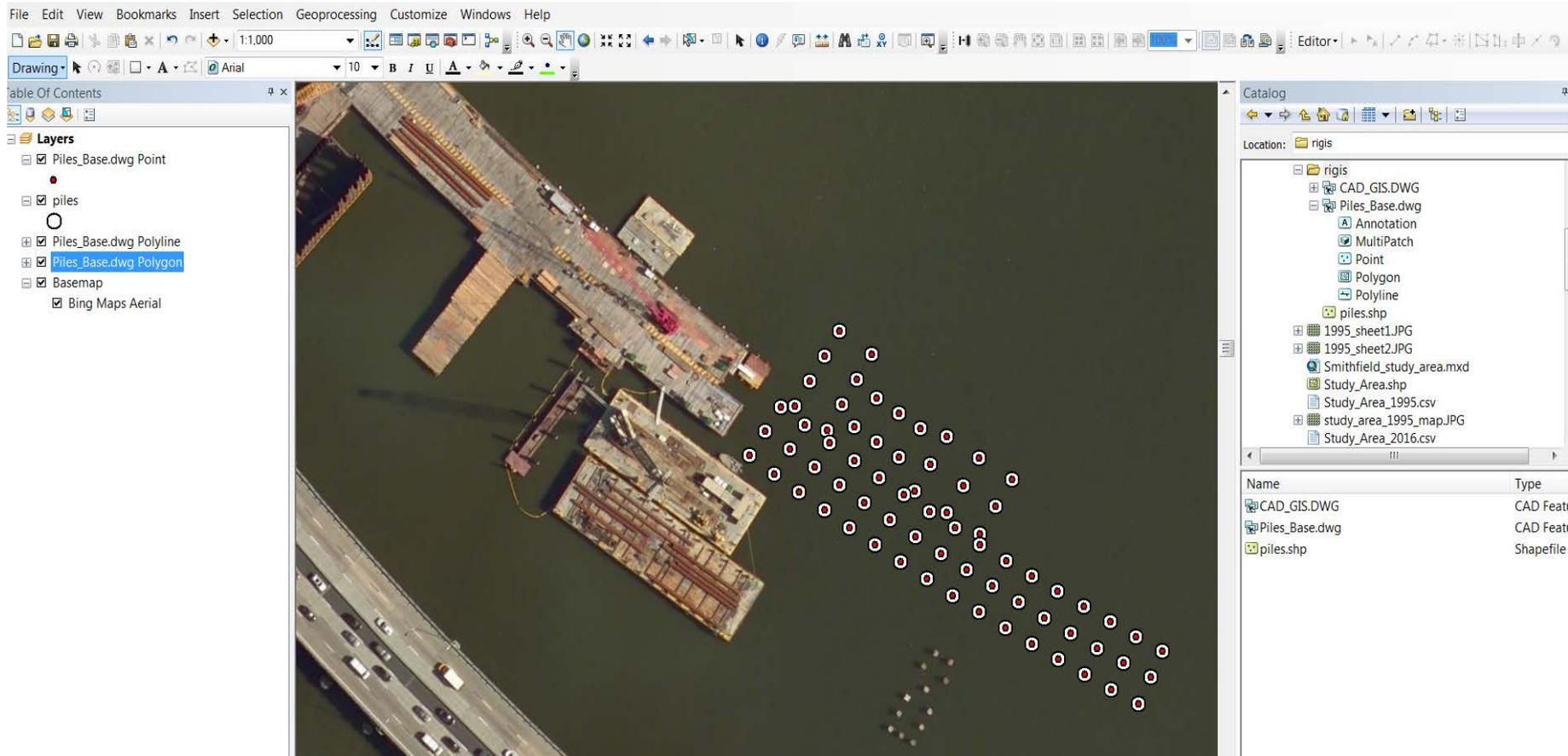
# Add shapefile to ArcMap

The screenshot shows the ArcMap interface with the following components:

- Table of Contents:** Shows the 'piles' layer checked and visible over the 'Basemap' (Bing Maps Aerial).
- Table Window:** Displays the data for the 'piles' layer. The table contains 11 rows of data, each representing a pile point.

FID	Shape	Autogenera	Name	Descripto	RawDescrip	Number	Elevation	Latitude	Longitude
0	Point	71	L8-J			-18801	0	N41° 04' 21.92"	W73° 54' 57.40"
1	Point	70	L8-G	L8-G	L8-G	-18802	0	N41° 04' 21.72"	W73° 54' 57.57"
2	Point	69	L8-D	L8-D	L8-D	-18803	0	N41° 04' 21.51"	W73° 54' 57.75"
3	Point	68	L7-J	L7-J	L7-J	-18804	0	N41° 04' 22.09"	W73° 54' 57.75"
4	Point	67	L7-G	L7-G	L7-G	-18805	0	N41° 04' 21.88"	W73° 54' 57.93"
5	Point	66	L7-D	L7-D	L7-D	-18806	0	N41° 04' 21.67"	W73° 54' 58.11"
6	Point	65	L6-G	L6-G	L6-G	-18808	0	N41° 04' 22.05"	W73° 54' 58.29"
7	Point	64	L6-D	L6-D	L6-D	-18809	0	N41° 04' 21.84"	W73° 54' 58.46"
8	Point	63	L5-H	L5-H	L5-H	-18810	0	N41° 04' 22.32"	W73° 54' 58.39"
9	Point	62	L5-E	L5-E	L5-E	-18811	0	N41° 04' 22.10"	W73° 54' 58.64"
10	Point	61	L4-H	L4-H	L4-H	-18812	0	N41° 04' 22.44"	W73° 54' 58.64"

# Connect to DWG in ArcMap 10 or higher



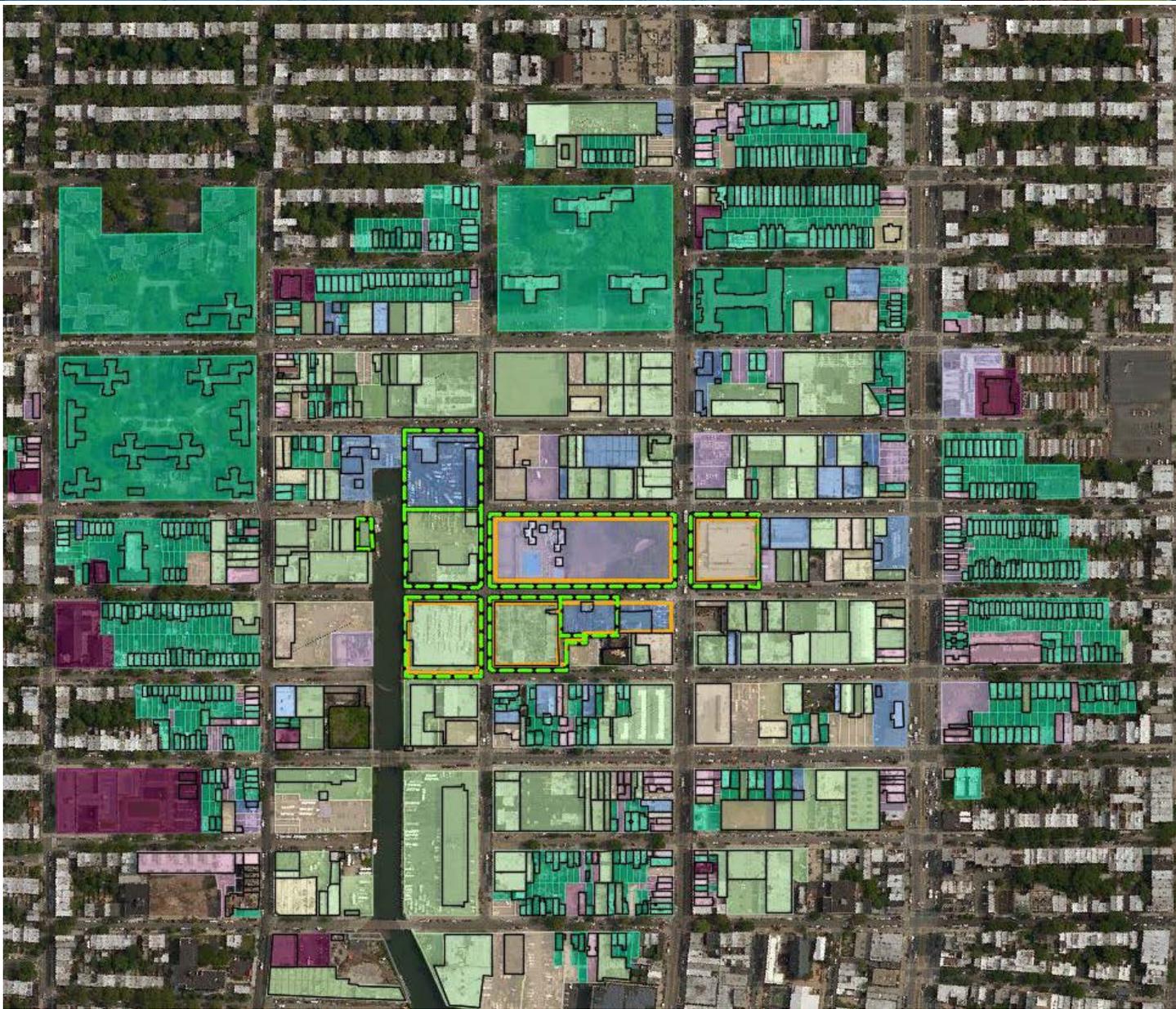
## Best Practices

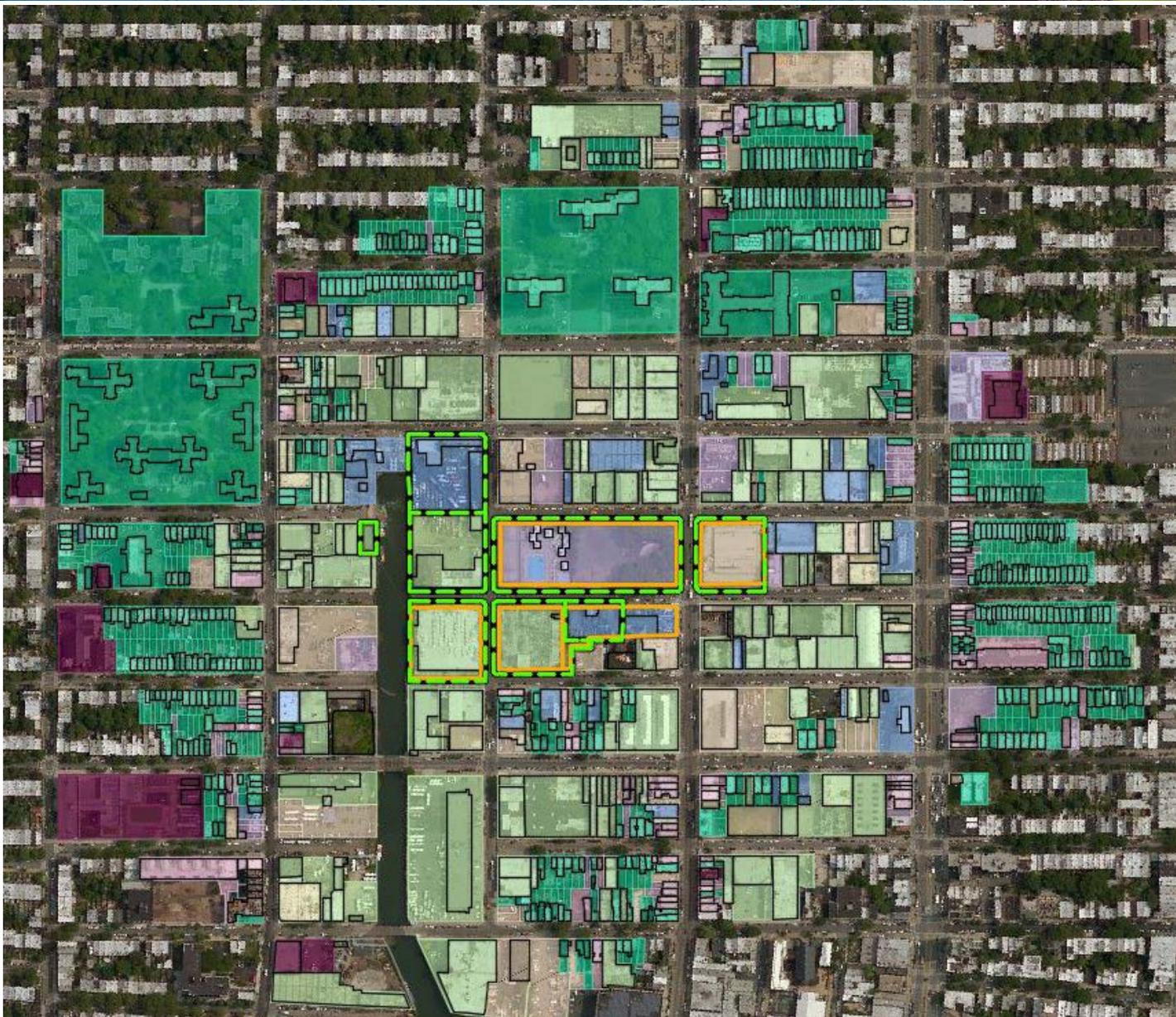
Get familiar with other software programs

Ask “What do I need to do with this data?”

Use the appropriate tool for the task at hand

Spread the word







# Thank You

